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RCEME TECHNICAL BULLETIN

Directorate of Electrical and Mechanical Engineering

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RCEME
TECHNICAL BULLETIN

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COVER: Our cover shows Brig KH McKibbin, CD, newly appointed Commander Western Ontario Area, on his first inspection of 204 Base Workshop RCEME. Left to right; WO 2 VS Proud, Brig McKibbin, Maj EG Jones, CD, and Lt Col WM Dalrymple, MBE, CD. See also page 28.

In Memoriam

James Russell Dunlop, OBE, ED, CD, psc, B (Mech) Eng, P Eng, MEIC
Engineer, Soldier, Citizen, Stone Cutter, Mason

13 December 1907 - 22 January 1962

What is the measure of a man?

Is it twenty five years devoted Service to Crown and Country?

Is it the love of his family and the warmth of his home?

Is it the conquering of the economic hardships of the thirties to become a professional engineer?

Is it the positions and the appointments held in professional life?

Is it a sense of the historical, mastering the ancient and respected arts of the stone cutter and mason?

Is it the development to a high degree of organizational skill?

Is it the sense of pride and privilege that his friends and colleagues feel in being associated with him?

James Russell Dunlop served his Crown and Country as a commissioned officer in the Militia (NPAM) and Regular Army from July 1935 to his retirement in January 1961. During this period he served with the Royal Canadian Corps of Signals to the outbreak of The Second World War when he joined the Engineering Branch of the Royal Canadian Ordnance Corps.

He married Miss Orian Carruthers, also of Ottawa in 1939 and they had two children, David and Sheila. Visitors to their home could not but observe their devotion to one another and their warm hospitality to their guests.

Money for a professional education was scarce in the early thirties and the economic depression that had settled over most of the western world forced him to interrupt his studies while he went to work. Graduation in mechanical engineering with a major in industrial engineering under the guidance of Professor James A Coote of McGill University took place in 1935.

Promotion, the recognition of leadership and ability, was achieved to the rank of lieutenant-colonel by February 1945 and to the rank of colonel September 1952.

During the war years he was given many important appointments: District Ordnance

Mechanical Engineer of Military District Number 3, in December 1941; Officer Commanding 2 Corps Troops Workshop in January 1943 and 10 Infantry Brigade Workshop in March 1944; second-in-command of Headquarters RCEME, 4th Canadian Armoured Division in June 1944; Commander, Headquarters RCEME, 2 Corps Troops in February and of 2 Canadian Infantry Division in June 1945. He returned to Canada in November of the same year to be appointed Assistant Director of Mechanical Engineering in December, a position he held until June 1946. After almost two years of extra-regimental employment he returned to the Directorate until his appointment as Commandant of the Corps School, Kingston, in December 1949. Here he influenced every officer, soldier, cadet and recruit by the excellence of his conduct and by the depth of his human understanding. He was selected to command his Corps in September 1952 and directed it with the unswerving loyalty of all his officers and men until his departure for Czechoslovakia as Military Attache in August 1957.

It was during this last appointment that he was stricken with cancer. He was operated on by Czech doctors in Prague and later by American doctors in Germany.

He returned to Canada in March 1960, retiring in January 1961, almost a year to the day before his death.

His appreciation of honest labour, of the skill in the hands of tradesmen, of the depth of knowledge of the artificer; his ability to correctly recall the names of the officers and men he talked to; his patience and his well developed ability to listen, endeared him to all the officers and men of The Corps.

His concern for humanity did not stop with training members of society who had chosen The Corps as a career. He also devoted a lot of time in assisting the staff of Kingston Penitentiary in expanding their trades training school as part of the prisoner rehabilitation program. His sense of antiquity, love of ancient skills and honourable trades that dated back to the first rays of civilization was satisfied by being trained in the arts of the stone cutter and mason by the Penitentiary's instructors.

His sense of humor was revealed when he answered the question of an amazed Italian stone mason he had hired to help him complete his home before leaving for Czechoslovakia by saying, "I learned my trade in Kingston Penitentiary."

His early training under the guidance of Professor Coote in Industrial Engineering and the subsequent application of the principles of organization resulted in an unusually fine sense of organizational ability that was officially recognized by the award of Officer Of The Most Excellent Order Of The British Empire during his appointment as Commander, Headquarters RCEME, 2 Corps Troops. His citation said in part:

"By a clear appreciation of the problems involved, sound forward planning and skilful control of his units, he ensured that all Divisions and Corps Troops had available at maximum effectiveness the complete facilities of The Corps of RCEME. Throughout the campaign in Northwest Europe, this officer has amply demonstrated his exceptional ability to organize and maintain at a high level of efficiency any RCEME unit he has commanded."

Colleagues and visitors alike always left Colonel Dunlop's office with a feeling of hope if they came with a problem, with a feeling of welcome if they were an unexpected visitor, with a feeling of awe at his knowledge of The Corps and with a feeling that the only problems of concern to him were their own individual problems.

A short time after his retirement he was struck again by cancer. Although he knew he had only a short time to live he conducted his business as a manufacture's representative with cheerfulness until he was permanently confined to his bed. Even then he would not accept defeat.

If these attributes be any measure, then James Russell Dunlop was indeed a great man.

VCGS CONFERENCE

The VCGS held a conference at the Canadian Army Staff College 23 - 25 Oct 61 to study the tactical concepts outlined in the pamphlet CAMT 1-8 "The Infantry Brigade Group in Battle, Part 1 Tactics" and the logistics concepts to support it.

During the conference all Corps directors were given an opportunity to state the changes they expected to make within their Corps to support the new concepts. In addition, they were asked to state the changes foreseen within their Corps during the next five years (1961-66).

Here is the DEME address given at this conference.

EDITORIAL

With this issue of the RCEME Technical Bulletin, some progressive steps have been taken. First, and most apparent, is the more suitable format; we think this size will make the Bulletin more readable and more interesting.

A second step involves an increase in readership. We have with this issue included RCEME Militia units in our distribution. We have also placed RCEME candidates in the Regular Officers Training Plan on the distribution list as an assist in maintaining the "family ties" during the academic year.

We will welcome - in fact MUST HAVE - contributions from these new sources in addition to those from units of our Regular force. These should be primarily of a technical nature.

This Bulletin, to be of most value, should be an exchange of ideas between East and West; between the senior and the junior; and between the Militia and the Regular forces of our Corps.

RCEME Planning

Address to the VCGS Conference by Col RA Campbell, OBE CD

INTRODUCTION

Previous speakers have emphasized the many changes which will occur as a result of the new concept of the mobile battle fought over a wide area of ground. The complete mobility of all units is at present an accomplished fact and from the RCEME point of view this total mobility is one of the most important factors affecting the Corps today; for although walking during a future war may be old fashioned, complete mobility carries with it an unprecedented financial and manpower penalty in the form of maintenance overhead. This costly condition is greatly increased by the introduction of many new and complex equipments all bearing additional maintenance costs.

It is obvious then that future plans for RCEME must include, as in the past, the means of achieving the Corps' aim in war which is to ensure the operational fitness of the mechanical and electrical equipment of the Canadian Army.

PLANS TO REDUCE MAINTENANCE OVERHEAD

Much attention is being focused on the subject of maintenance overhead by the UK and US Armies. Reduction of maintenance overhead can be achieved:

a. Through decentralization of some maintenance responsibility to the operator,

b. Through the design of less complex equipments and,

c. Through more built-in reliability accompanied by ease of maintenance features.

To indicate current action being taken by the Canadian Army to reduce maintenance overhead, user maintenance trials have been carried out in 4 CIBG with infantry and armoured personnel being trained to carry out certain unit repairs normally the responsibility of tradesmen. The overall problem is complicated by different requirements for M score and academic qualification of the operator. Final advantages will not be known for some time.

Proposals to make certain tradesmen organic to the unit they serve have been submitted. This will give unit commanders specific maintenance responsibilities as well as command of the technicians on their establishment who are responsible for performing unit maintenance tasks.

The term 'reliability' I just mentioned is becoming a very important factor in the development of equipment. Reliability may be defined as the probability of performing without failure a specified function under given conditions for a specified period of time. New weapons tend to be unreliable because of their complexity, greater power, the requirement for increased safety devices, and a tendency toward electrical and electronic controls. All these increase the incidence of failure. The high cost of testing prototypes and the smaller numbers of equipments produced, introduces special problems of production and inspection. Studies to improve reliability are being carried out and this subject is receiving considerable attention in both the USA and UK. It is hoped that a policy statement for the Canadian Army will be ready for presentation shortly.

'Ease of Maintenance Characteristics' is a term with which you are perhaps more familiar. Increased complexity in new equipments demands a higher man-power bill for maintenance. To avoid this, new equipments must be designed with ease of maintenance characteristics built into the equipment. RCEME has been assigned this responsibility, but because we design very little and buy more of our equipment from other countries this will probably never be fully exploited.

We have developed a set of 'Principles of Maintenance'. Once an equipment has been acquired for service use, the following seven principles of maintenance will govern the quality of the service RCEME can give with the lowest possible maintenance overhead. Commanders and staff officers should keep these in mind to get the most out of their RCEME support.

a. First, the maintenance overhead is directly proportional to the quantity and complexity of equipment; the two factors that determine RCEME establishments.

b. Secondly, the unit commanders must be assigned specific maintenance responsibilities and must command the personnel responsible for performing the work. To this end it is planned to disband LADs and make the unit maintenance personnel organic to units. In line with this it has been recommended that the brigade group LAD be disbanded and the tradesmen be included in the infantry battalions and brigade group HQ establishments.

c. Rapid, accurate and complete diagnosis as far forward as possible will permit more rapid repair. Accurate diagnosis can only be done by our most experienced technicians and the Corps policy is that our best tradesmen will be with units. Field repair in the forward area is dependent on this diagnosis so that the mobile repair team will arrive with the proper assemblies.

d. Repairs must be carried out as far forward as possible in order to keep the maximum numbers of equipments operational.

e. The fifth principle is that the maintenance organization must be flexible in order to be capable of deployment to suit the tactical plan. The commander must never be hindered by a lack of equipment maintenance.

f. Next the maintenance system must be enforced by inspections, education and advice and,

g. Repair can only be effected when skilled labour, tools and parts are all applied to the casualty at the same time. We control the first two but RCOC control the third and our service is therefore dependent to a degree on another corps. Continued co-operation between the two corps is therefore vital.

OPERATIONAL PLANNING

To support the principles just mentioned, a new method of employment was required and the 'Forward Repair Platoon' system was devised, tested and is now used as a Standard Operating Procedure in the combat zone.

The proposed Field Workshop Establishment now includes a forward repair platoon consisting of 16 mobile repair teams. The teams are capable of carrying out in situ field repairs, thus reducing loss of time out of action for essential operational equipments. Those of you who have been associated with summer concentrations in Canada for the past two years will perhaps have experienced the advantages of this type of organization.

'Aircraft Servicing and Maintenance' has been added to the RCEME tasks and the maintenance of fixed and rotary wing aircraft is fast becoming commonplace as one of RCEME's newest responsibilities. The first helicopters will soon see service in Europe and the necessary maintenance personnel have been trained and are now becoming familiar with the Hiller so that as the aircraft are received they can go directly into their service roles with accompanying maintenance support.

'Cannibalization' will likely be used on an unprecedented scale in future wars and a large maintenance float of equipment will be required unless reliability and ease of maintenance of our equipment are greatly improved. A very responsive spare parts supply system is a must because everything needed cannot always be carried. In the forward area particularly, damaged equipment will frequently be stripped of usable parts and assemblies to restore other equipment to operational condition. Cannibalization will be extremely difficult to control and the solution will be a command responsibility.

The mobile battle fought over a wide area of ground, and the great distance separating

workshops from the battle area, change the system of repair from that we employed in The Second World War and Korea. Backloading as we know it will no longer be practicable and large numbers of vehicles or equipments will not move to workshops in rear. Neither will large backloading points be established because they present lucrative targets which cannot be concealed. The medium workshop will be immediately in the rear of the division to give intimate and rapid support by repairing the casualties beyond the capacity of the field workshop. No doctrine has yet been developed for medium workshops in this new role, but this problem will be studied during the next year.

Base Workshops in a theatre will also present too lucrative a target and will not likely be established because equipment will stay forward. Equipment will be repaired, cannibalized or destroyed. This also makes it mandatory to keep to a minimum the equipment issued to units.

The following new equipments have been or will be introduced into the army and will have a considerable effect on RCEME. They are:

Bobcats
Light Aircraft and Helicopters
Radiation Detection Equipment
Surveillance Radar
Tellurometers
Counter Mortar Radar
Honest John Launchers

It also appears that there is to be a substantial increase in the holdings of electronic equipment within a formation.

Tradesmen have been or are being trained to maintain these equipments and I plan that they will be in units by the time the equipment is issued. We have been able to do this recently for the Hiller and the Honest John.

With the introduction of helicopters for army use the possibility of recovery and backloading by heavy lift helicopters will be investigated. Just picture the number of recovery tasks a helicopter could perform in the time required to backload one truck 75 miles at night using conventional wreckers. This field must be fully explored. In addition, parts urgently required in the forward area may be delivered by helicopter.

CONCLUSION

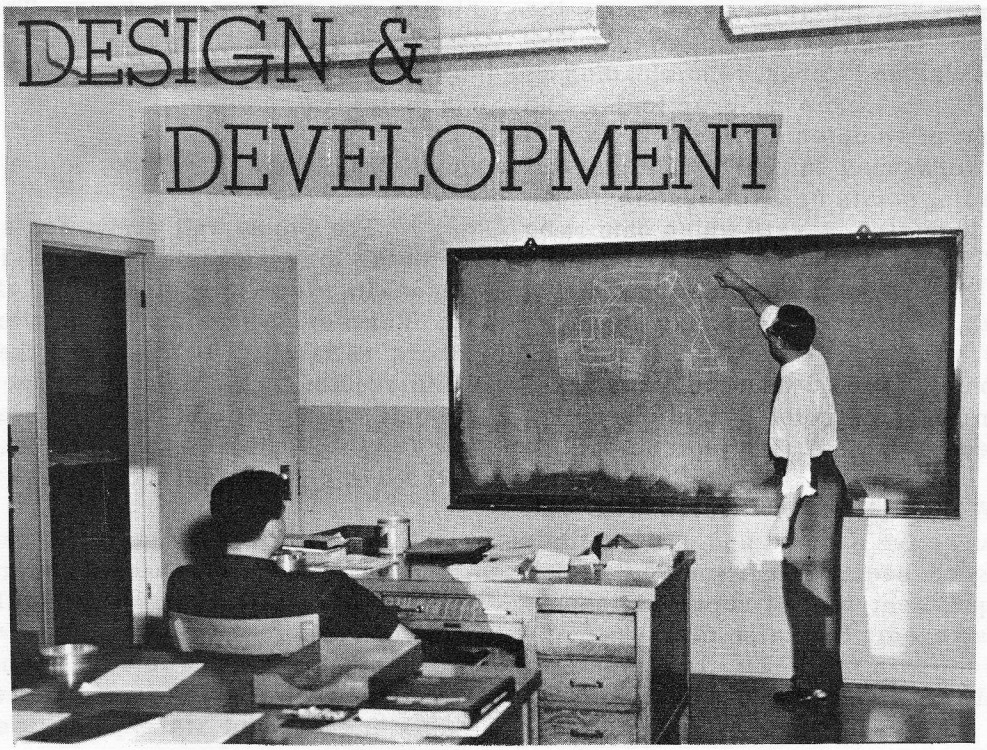
The Corps will strive for speedy repair with the lowest possible overhead but the continual increase in equipment holdings is bound to increase the maintenance overhead unless more reliability is built into the equipment. The reliability factor of any new equipment should be studied and carefully weighed before new types of equipment are purchased. We must all learn a great deal more about this subject.

The Corps will strive to set up a maintenance organization that will operate so as not to limit the commander's tactical plan. Staff officers and regimental officers will be called on to direct parts of this maintenance organization and these officers will therefore have to know more about its capabilities and limitations.

Before new equipment is procured we should look behind the division to see what nationality is likely to be able to support it during war. Consider the problems ahead of us with the Bobcat and even the Hiller 12E which neither the British or US are likely to hold. Remember the problems we had in Korea until we got rid of Canadian built vehicles and procured US types.

We will have to pay a price for increased mobility when APCs are introduced. Remember the Bobcat in its present form takes five times as much maintenance effort as the 3/4 ton truck at the unit level, and helicopter maintenance is also costly in terms of manpower. We will strive to keep maintenance overhead within reasonable bounds but even then the price will be high.

DESIGN & DEVELOPMENT



Lt Hyman (at blackboard) and Lt Bourassa (seated)
in Design Engineers' Office Discussing Design of Recovery Kit

By MAJ BM DEIBERT, CD

On page 18 of the Jun 61 edition of the "RCEME Technical Bulletin", the Corps director referred to the organization of a design section at 202 Base Workshop. This section is now in operation and it is believed that this is the first time that the RCEME Corps has undertaken directly a design and development function. Certainly RCEME has always been a logical, fruitful source of personnel for development establishments and no doubt the ideas of our highly trained technical personnel, tradesmen, artificers and officers, regardless of where they are employed, have always represented a worthy contribution to Canadian Army development work. This Design Department of 202 Base Workshop is however the first such entity authorized as an integral part of a RCEME unit.

This Department has the responsibility of designing and developing SEV kits for the Bobcat. This responsibility in the final analysis demands the following end products:

a. Production of one prototype of each kit;

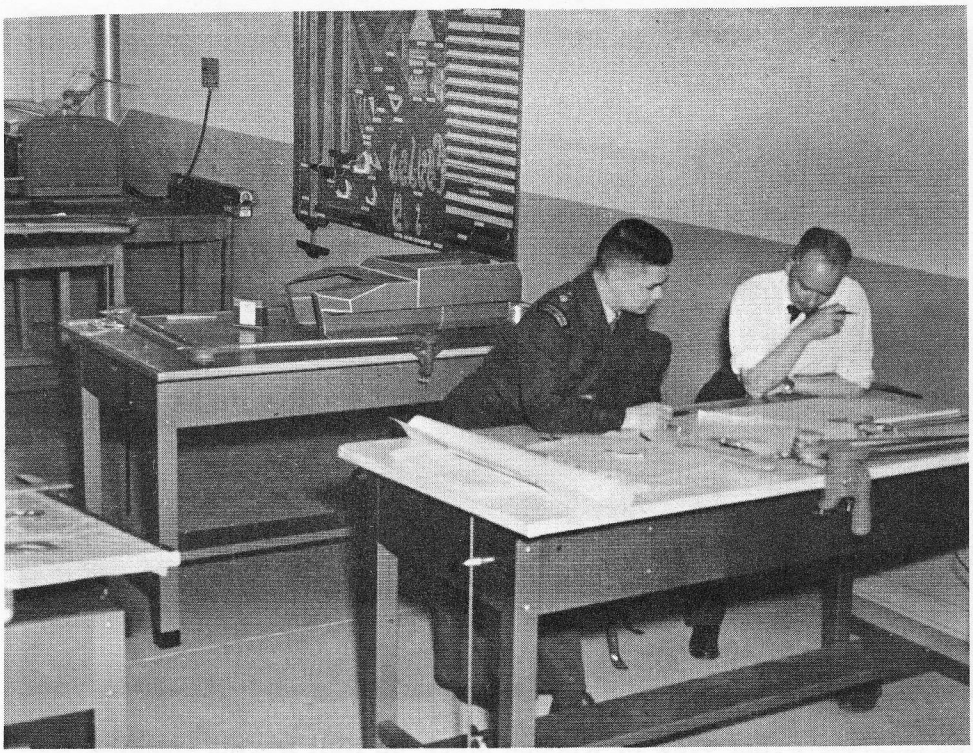
b. Provision of a complete set of manufacturing drawings for each kit;

c. Provision of installation instructions for each kit;

d. Provision of operating, maintenance and repair instructions for each kit;

e. Provision of parts lists for each kit.

The first overtures on this subject were made to DEME approximately Feb 61. Production of the Bobcat had just been authorized and the necessary funds allocated. As was the case with the Canadian Army family of standard military pattern wheeled vehicles around 1950, there was now one major outstanding task, the development of kits which could be used to convert the basic Bobcat vehicle into specialist

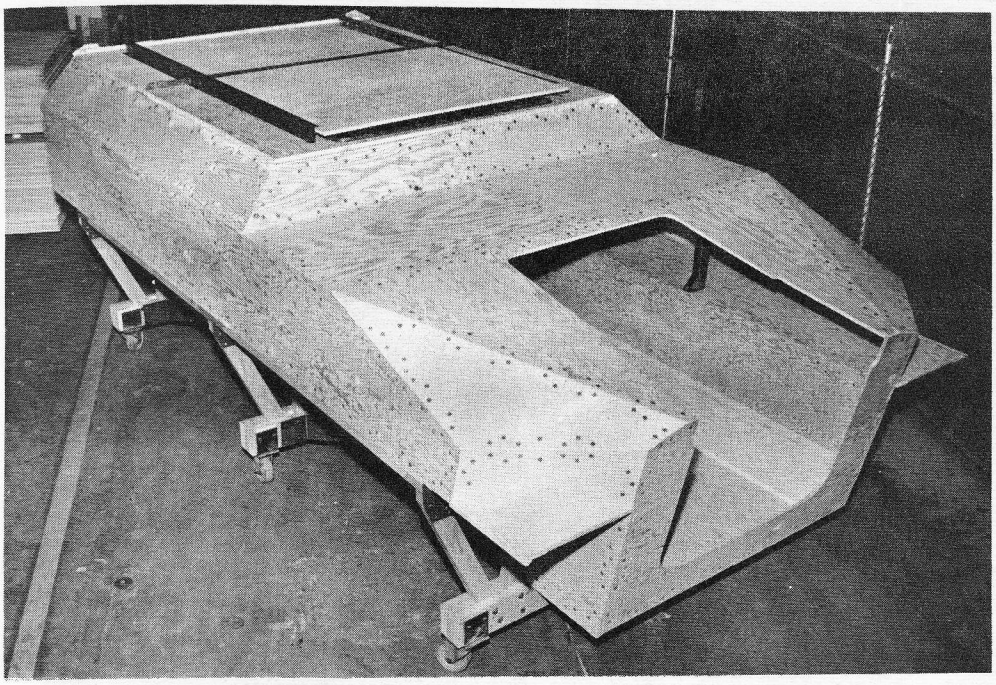


Lt Perry Discussing Design Problem with Draftsman Mr G Scullion

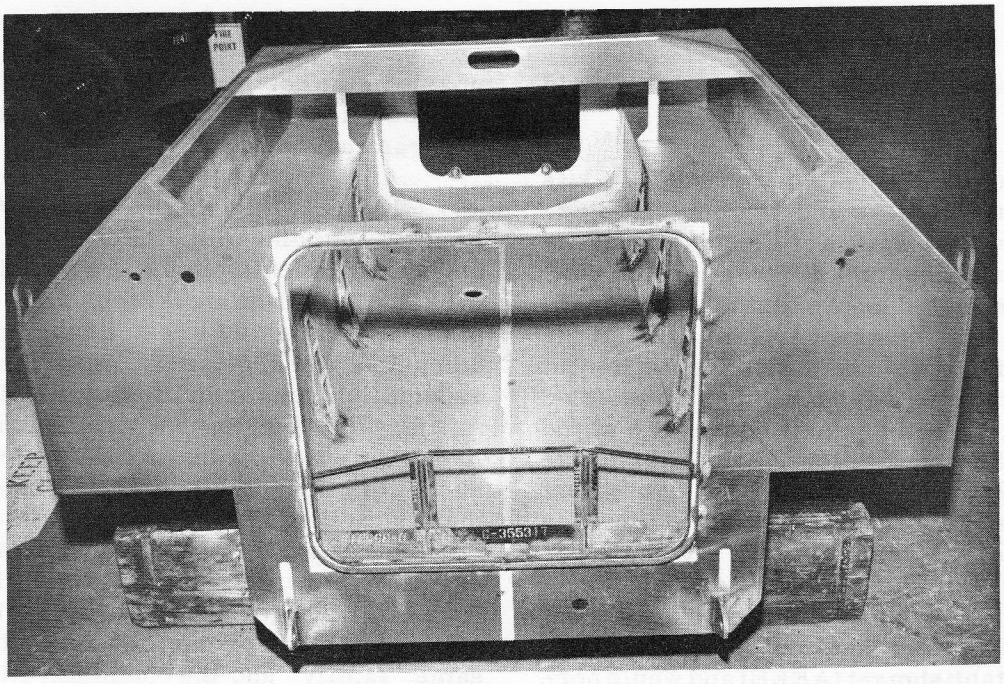
vehicles to make it suitable for the various field roles.

Some of us will recall that the SEV kits for our military trucks and trailers were developed by Leyland Motors of Canada who eventually produced about 60 different prototypes. The program lasted approximately five years from the time the contract was let. While the number of different types of kits for the Bobcat is small compared to the number of wheeled vehicle kits, it was deemed necessary at the outset that they be developed within approximately 1 1/2 years in order that this aspect could be phased in properly with the production schedule of the vehicle itself. It was clear therefore that this work would have to be started at a very early date. Such a task could not be undertaken by the Army Equipment Engineering Establishment (AEEE) and would normally be contracted out to a competent civilian firm. The prospect of the inevitable protracted period for contract negotiations loomed ominously in the horizon and the authorities at AHQ worked quickly to avoid this delay in getting the program under way.

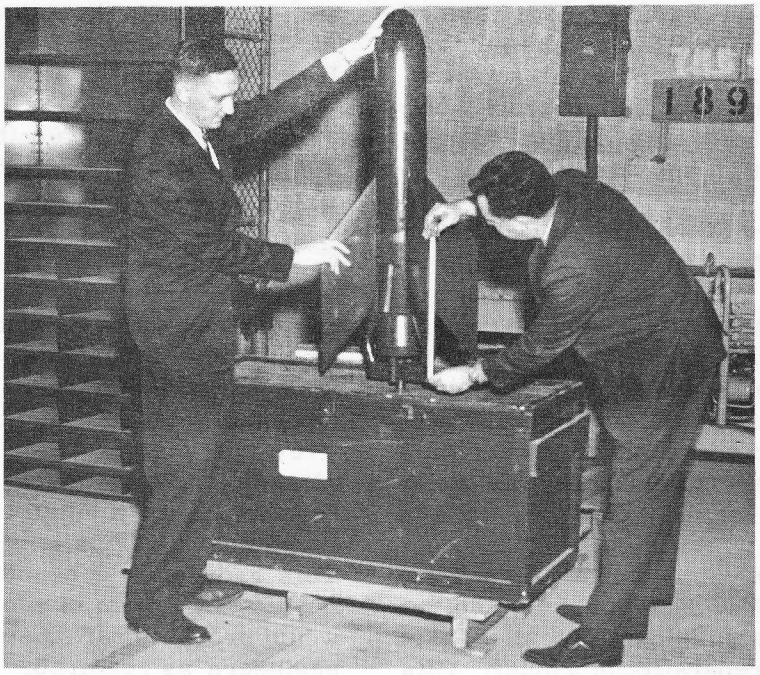
It was at this stage that RCEME customer relations came to the forefront as an important factor to change the normal course of events. The base workshops have during the past few years carried out a considerable amount of work under the auspices of AEEE, especially manufacturing and installing kits in military pattern trucks, trailers and AFVs. It was soon evident that AEEE preferred to get such work done by RCEME workshops rather than by civilian contracts. Aside from virtually eliminating the contract negotiation time, AEEE discovered that dealing with an army workshop was so much easier than with a civilian firm. For one reason both are in the same "family" and the communication of ideas and instructions in either direction is not as difficult. More important though is the fact that the workshop as the "contractor" has the



Three Quarter Front View of Wooden Mock-up Hull During Construction



Rear View of Mild Steel Hull During Construction



Capt Daviss (l) and Lt Bourassa Checking Dimensions
on Mock-up of SS-11 Anti-tank Guided Missile

Lt Comeau (l) Discussing Design of Wooden Mock-up Hull
with Capt Burcombe

interests of the "customer" at heart and is not influenced by that all-pervading desire to make a profit. This is a critical factor when the unavoidable design changes, material substitutions, different manufacturing processes and target dates have to be reconciled with the demands of the production specification.

Whatever the reasons, DEME was asked if it were possible for 202 Base Workshop to undertake this job. A series of meetings between the Directorate of Equipment Engineering (DEE), AEEE, DEME, and 202 Base Workshop during Mar-Apr 61 showed that the workshop could do the work providing its establishment was augmented with a small design staff and suitable office accommodation was made available.

Now that it was decided at the director's level that 202 Base Workshop could take on the task, preparations started in earnest. First there was the usual preparation of a brief. This was for the benefit of the DQMG (EE) who had to present the proposal to the QMG for his approval. In this substantiation the following main points were covered:

a. Reasons why the work should be done at 202 Base Workshop;

b. An estimate of what 202 Base Workshop required by way of additional staff, accommodation and equipment;

c. An outline of the relationship between 202 Base Workshop, DEME, AEEE and DEE if the proposal went through.

When the QMG approved the plan, a directive had to be prepared for him whereby he could issue the necessary instructions to the "Q" directorates to get the preparatory work completed. The directive issued on 15 Jun 61 called for high priority action in the following activities:

a. The clearance of approximately 10,000 sq ft of floor space in the south west corner of Warehouse 11 by 25 COD where the construction of suitable accommodation was planned.

b. The erection of offices, drafting room and store room in that area by 4 Works Coy RCE. Plans for this were drawn up by 202 Base Workshop.

c. The issue of furniture, tools and equipment by RCOC. A list had to be prepared by 202 Base Workshop.

While the "Q" preparation work was being implemented, DEME was instructed to submit the necessary recommendations for an amendment to 202 Base Workshop establishment. It was envisaged that the new department would be managed by a major (TSO) with five or six young RCEME professional engineers as designers, 3 RCEME artificers as technicians and a small clerical staff under the immediate supervision of a WO 2 RCEME clerk. This group would be supported in the design function by a firm of consulting engineers who would provide draftsmen and additional design engineers as required. Meanwhile, DEE had been instructed to negotiate a contract through DRB with a suitable firm of consulting engineers and provide the financial encumbrance from development funds from which 202 Base Workshop could procure services and material. After a considerable amount of hard work by all involved, and with the co-operation of the various AHQ Directorates and Service Units, the preparatory work was completed in good time. 4 Works Coy RCE did an excellent job in the provision of accommodation and Ordnance, with 25 COD doing most of the work, arranged the supply of all the F&E with very little difficulty.

On 10 Oct 61, the new accommodation was occupied by the Design Department. The accommodation was complete, the bulk of F&E had by this time been assembled and all military personnel except one were on hand. Military personnel in the Design Department are:

Maj	BM	Deibert	- OC Dept
Capt	LA	Daviss	- Design Engineer
Lt	WR	Hyman	- Design Engineer
Lt	WC	Perry	- Design Engineer
Lt	PR	Comeau	- Design Engineer
Lt	JMF	Bourassa	- Design Engineer
S sgt	GS	Newell	- Chief Clerk

Maj Deibert, Capt Daviss and Lt Hyman were already on 202 Base Workshop establishment. Lts Bourassa, Comeau and Perry and S sgt Newell were posted in from other units. Lt Romyn will be coming from 204 Base Workshop and will be the sixth military design engineer on the project.

The organization of the Design Department is shown in Fig 1. It is a part of 202 Base Workshop in exactly the same manner as the other departments. It does, however, have its own unit account number to facilitate receipt and control of F&E and the multitude of stores required to produce the prototype kits. In all other aspects it is administered and controlled by 202 Base Workshop. The Civilian Contracts Section of the Workshop has been provided with an EE from AHQ Development Funds to provide local contract services for the department. The 25 COD Spare Part Stores Group, which supports 202 Base Workshop, has been given a similar fund to procure materials for use on the project. The normal resources of the workshop are used for manufacturing parts, fitting kit items, etc. GL White & Partners, Montreal, have a contract to support the department by providing additional design engineers, all the draftsmen and a technical writer.

As has been mentioned before, the Design Department is on the establishment of 202 Base Workshop. Since it has in fact undertaken a development contract with AEEE, the normal relationships between base workshop and AHQ do not apply in all respects. A policy letter was therefore issued by DQOP to outline the terms of reference and responsibilities of all concerned.

The development work has to be done to the satisfaction of AEEE which provides the development specifications. Therefore on all technical aspects of design, the department deals directly with AEEE which has three project engineers almost continually at 202 Base Workshop as liaison officers. All policy matters are passed through DEME, eg, matters relating to priority of work, target dates. The Civilian Contract Section of the workshop and SPSG of 25 COD submit semi-monthly reports on local contract expenditures to DEE where development funds are controlled. DEE is also the approving authority for special tools costing in excess of $100.

The terms of the project call for the development of the following kits:

Ambulance
1 Radio Set
2 and 3 Radio Sets
Medium Power Radio
Cryptologic Centre
Message - Telephone Switchboard Centre
Message - Teletypewriter Centre
Message - Telegraph Centre
A/Tk Guided Missile
106 mm Rifle
81 mm Mortar
Repair and Recovery

At Fig 2 is a chart of typical activities comprising the development work for a kit. This chart is in the form known as an "Arrow Diagram" used in the "Critical Path Planning and Scheduling" technique. The program is closely associated with the production of 20 pilot model vehicles by Canadian Car. It is highly desirable to determine at an early stage the common attaching features which can be built into the basic vehicle. Design of the kits must be such that the basic vehicle will not have to be modified when kits are installed. Standardization in the use of materials, components, etc, must always be a prime consideration. The designs must be simple enough so that the kits can be installed by any RCEME field workshop. Finally, the ease of maintenance must be considered at all times. For this purpose, WO 2 HC Milne is available as the RCEME representative both at Canadian Car and 202 Base Workshop.

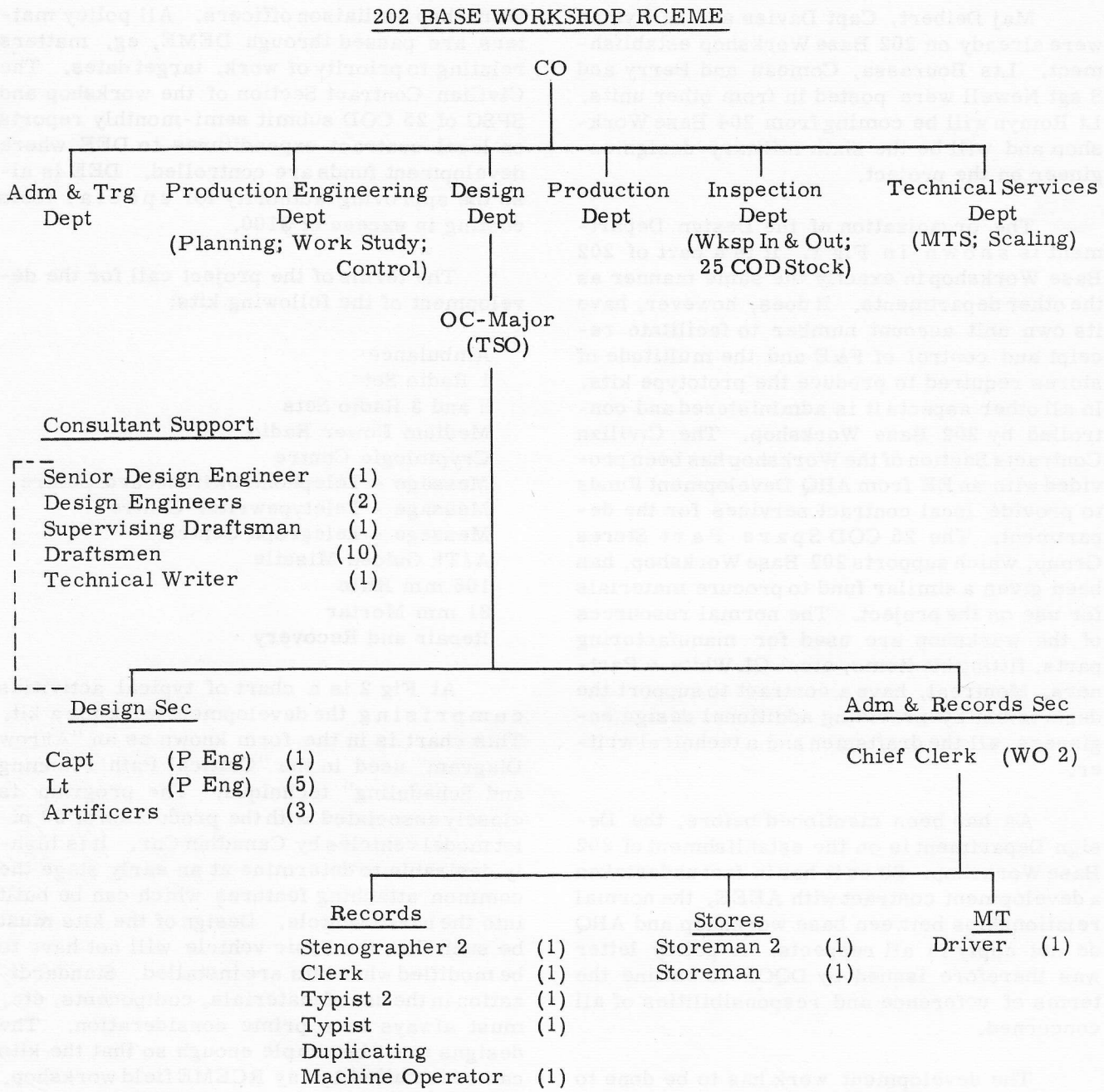
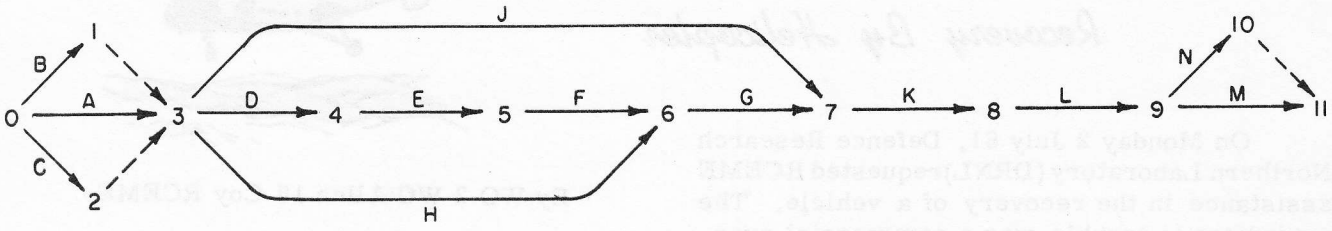


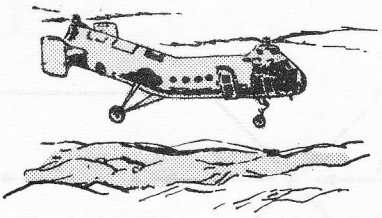
Fig 1 - Organization of Design Department



Activity	Details
A	Procure development specification from AEEE
B	Procure existing kit items
C	Manufacture mock-up hulls
D	Design kit, manufacture outstanding kit items and install as mock-up hull
E	User assessment of mock-up kit
F	Modification of mock-up and completion of design
G	Manufacture of prototype kit
H	Determination of as many common attaching features and common items as possible which can be built into the basic vehicle
J	Preparation of drawings and technical literature
K	Proving installation instructions
L	Functional and reliability tests of kits, eg, firing mortar installed on vehicle, running vehicle with kit installed over test courses at Vehicle Proving Ground, Ottawa
M	Modification of prototype kit
N	Finalization of drawings and technical literature

Fig 2 - Typical Design and Development Activities

Recovery By Helicopter

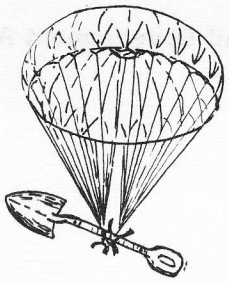


By WO 2 WG Allen 18 Coy RCEME

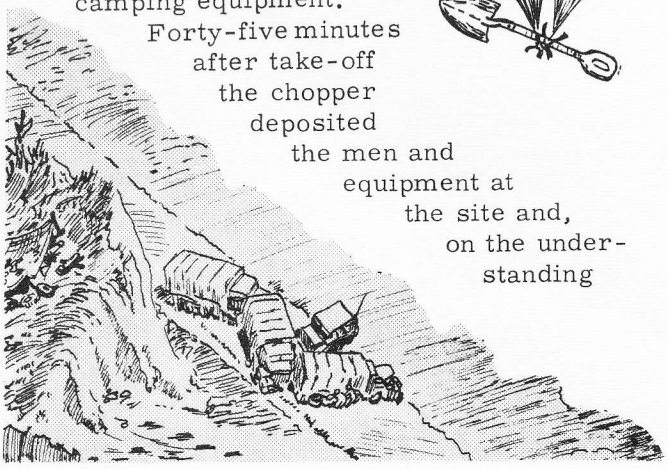
On Monday 2 July 61, Defence Research Northern Laboratory (DRNL) requested RCEME assistance in the recovery of a vehicle. The equipment in trouble was a commercial over-snow Nodwell Model RN 21, which was bogged in a tundra slough about sixty-five miles south of Fort Churchill. Apparently when the vehicle was driven into the slough, the bow wave drowned the engine, and the operator could not restart it.

The location was about three miles from a railway siding, and shipping a tracked vehicle by rail to effect the recovery was considered. However, the full-tracked Nodwell is relatively light, and was not too deeply bogged, so it was decided to try recovery by hand.

July 3 and 4 were Carnival days in Fort Churchill, when virtually all other activities ceased, so preparations didn't get under way until 5 July. On 6 July Sgt EJ Pickett and Cfn SD Low, and I with three DRNL mechanics boarded a US Army H21 helicopter complete with equipment thought necessary for the job and, as helicopters only fly when visibility conditions are above a certain minimum, overnight camping equipment.



Forty-five minutes after take-off the chopper deposited the men and equipment at the site and, on the understanding they would return at 1600 hours, the helicopter returned to Fort Churchill.



The vehicle was found buried over the tracks in muskeg with water up to the bottom of the carburetor. The engine was submerged so the Nodwell had to be retrieved before anything else could be done. As there were no trees or natural anchors in the vicinity, ground anchors from the M62 wrecker had to be used. DRNL brought a portable diamond drill on the job but it was found possible to place the anchor pins in the perma frost with much hard sledge work, so it was not needed. In fact, much of the equipment taken on the job was not required, but due to the method of transport, over-insurance was considered advisable.

The actual recovery was made by a 2-to-1 hook-up using the ground anchor as the fixed point and a 2-ton chain hoist as motive power. The moving block was attached to the towing hook of the vehicle by steel cable. To hold the distance gained while the chain hoist was being moved, a cable from the ground anchor was clamped to the cable from the vehicle. The chain hoist had to be reset five times to move the Nodwell 30 feet to firm ground.

Working conditions were uncomfortable because of insects and the clothing which had to be worn; coveralls, hip rubber boots and mosquito nets. The moose flies and mosquitos were so thick at times that they covered a man's back as he bent over. The moose fly, to those who haven't seen one, is about 3/4-in long, looks

(Continued on page 25)

TECHNICAL NOTES

TRADES TRAINING

RCEME MILITIA

When the Provisional Instruction on Individual Training, Canadian Army (Militia) was issued under HQ 3271-1 (DMC) dated 24 Jul 59 only the following trades were authorized for RCEME Militia:

Militia Vehicle Mechanic Groups 1 and 2
Militia Recovery Mechanic Group 2
Militia Radiac Mechanic Groups 1 and 2
Militia Welder Groups 1 and 2
Militia Electrical Mechanic Groups 1 and 2
Militia Driver Mechanical Transport Group 1
Militia Clerk Administrative Group 1
Militia Signaller Group 1
Militia Storeman Accounting Group 1

Since that time, trade specifications for the last four trades have been issued. Specifications for the first five have been written but are not yet approved. It is hoped that they will be ready for issue by 1 May 62. The training standards issued as Annex 9 to HQ 3271-1 (DMC) dated 24 Jul 59 are the only authorized guides available. Trade tests for qualifying militia tradesmen will be written locally for each block until the new specifications are issued at which time the trade tests for each block will be prepared and issued by AHQ. Considerable changes have been made in the proposed new specifications. They now consist of two blocks only in each of the two trade groups. As each block is designed to be covered in one training year, this will mean that full qualification to the group 2 level can be accomplished in four years. It will also mean that each trade is now more equitable in the training time required. Instructions will be issued with the new specifications detailing the corresponding qualifications to the present trade standards.

Recovery Mechanic Training

To provide a sufficient number of candidates for Recovery Mechanic training, DMC authorized on message DMC 499 dated 30 Nov 61, the selection of qualified Vehicle Mechanics Group 1 in addition to those qualified as Militia Driver Mechanical Transport Group 1. This authority is granted only for the current training year. The requirement will be reviewed in Aug 62.

RCEME Corps Association Competitions

The annual Junior NCO, Rifle and Tradesmen Competitions are again being run. Some changes in the rules authorized at the last Corps Association meeting are being made. They are as follows:

Rifle Competition. 50 percent of the unit strength (less non-effectives) is to be calculated at the time of the firing practice rather than at 31 Mar as in former years.

Junior NCO Competitions. The effective strength of the unit (less non-effectives) is to be calculated as at 31 May rather than 31 Mar as in former years.

Tradesmen Competitions

a. The effective strength of the unit (less non-effectives) will be calculated as of 31 May rather than 31 Mar.

b. One credit for each block of a trade including group 2 in which a tradesman qualifies in any one training year will be allowed. The only trades in which RCEME Militia tradesmen may qualify are those listed above.

c. When a tradesman qualifies in blocks of more than one trade, one credit will be allowed for each block in which he qualifies in any training year.

It is hoped to have the new competition rules issued by 31 Jan 62.

CANADIAN ARMY (REGULAR)

Aircraft Trades

Amendments which have been made to the

specifications for Airplane Technician and Helicopter Technician are being issued in AL 33 to the Canadian Army Manual of Trades and Specialties. These amendments require additional training for group 3 in Before Flight Inspection and Primary Inspection procedures for instrument, electrical, radio and safety equipment. This provides a qualification approximately equal to the RCAF Crewman.

Under HQ 3221-1 (QMG) dated 27 Nov 61, signing authority was granted to group 3 Airplane Technicians and Helicopter Technicians who have qualified, been certified by an Aircraft Maintenance Officer, and for whom an entry to that effect has been made in Unit Orders Part 1. Qualification to the specification does not automatically grant signing authority to an individual. To maintain this signing authority, an individual must:

a. Be recertified annually, or

b. If he has not been employed on the same type of aircraft for six months or more, he must be recertified.

Pre-Artificer Assessments

New pre-artificer assessment standards were issued in a blue-covered booklet dated October 1961. Two amendments for these standards have been issued dated 25 Oct and 15 Nov. Candidates should ensure that these amendments have been made in their copy.

Standards for Aircraft Artificer candidates have been added to the booklet. Test papers used for last year's examinations are available (except for the trades assessment for Aircraft Artificer candidates) as a guide to the type and layout of the papers he can expect to write in April. It will be noted that the final closing date for nominations to write this year's tests is 16 Mar 62.

Vehicle Trade Specifications

New specifications have been written for the three vehicle trades. They are now being processed through Army Headquarters and it is hoped to have them authorized and issued by September 62.

NEW COURSES

Semi-Conductor Devices

This course has been authorized and one serial is scheduled from 5 Feb 62 to 16 Feb 62. This is a two-week course to familiarize tradesmen in the radio, radar, fire control system and electrical trades with semiconductor devices. Although only one serial is scheduled for this year, additional courses will be run during the next training year.

National Defence Fallout
Reporting Post Equipment

A two-week course for selected personnel who are to be employed on the inspection and calibration of radiac equipment installed in fallout reporting posts is being planned. It is hoped to have them qualified before 1 Apr 62.

Trade Tests

The following new trade tests have been issued during the past year:

a. Airplane Technician Group 2 - Apr 61

b. Airplane Technician Group 3A - Apr 61

c. Electrical Mechanic Group 2 - Aug 61

d. Electrical Mechanic Group 3A - Dec 61

e. Fire Control System Technician Group 3A - Jul 61

f. Helicopter Technician Group 2 - Apr 61

g. Helicopter Technician Group 3A - Apr 61

h. Machinist Fitter Group 2 - Aug 61

i. Vehicle Mechanic Wheeled Group 3A - Jan 61

j. Weapons Technician Group 1 dated Apr 61 and amendment No 1 which includes new pages 17, 44, 45, 46, 47, 48, 49, 53, 54,

55, 56, 57, 58, 59, 60 & 61

k. Weapons Technician Group 2 dated Apr 61 and amendment No 1 which includes new pages 20, 41, 42, 43, 44, 45, 46, 47, 50, 51, 53, 54, 55, 56, 57, 58, 59 & 60

l. Weapons Technician Group 3A dated Jan 61 and amendment No 1 which includes new pages 28, 42, 69, 70, 71, 72, 73, 74, 75, 76, 81, 82, 83, 85, 86, 87 & 88

m. New amended pages 4, 5, 12, 13, 14, 15, 16, 21, 23, 24 & 25 to Welder Group 2

PLANS AND ORGANIZATION

STATUS OF RCEME PUBLICATIONS

Here is a progress report on the writing of the new series of RCEME training manuals.

CAMT 11-1 "RCEME in Canada"

Authority to publish this training manual has been received. The manual is now in draft form and after final editing it will be available for printing early in 1962. This is an up-dated edition and covers RCEME organizations and operations in Canada. It will supersede the present CAMT 11-1 RCEME Training, Volume 1, "Basic Organization and Role (1957)".

CAMT 11-2 "RCEME in the Field"

This manual was published and issued in 1960. The first amendment was forwarded to DMT for approval in Sep 61.

CAMT 11-3 "Command of a RCEME Field Unit"

Information for this manual is being collected and it is expected that the first draft will be completed by July 1962. It will cover the internal operation of a RCEME field unit including recommended standing orders, standing operating procedures, statements of duties, and organization.

CAMT 11-4 "Recovery Technique"

This manual is expected to be distributed during Mar 62. It contains a comprehensive study of all aspects of equipment recovery, and is an up-dated Canadian version of REME Training, Volume X, "Recovery Technique", 1958.

CAMT 11-5 "RCEME Terminology"

This reference book is now at the Queen's Printer and should be available for issue early in 1962. It defines terms commonly used by RCEME personnel as well as terms used in association with management and labour relations.

FLAGSTAFFS FOR STAFF CARS

Requests for authority to fabricate flagstaffs for staff cars are occasionally received. To meet the estimated need for this item a number of Flagstaffs, steel, chromeplated, 3/8 inch by 10 inch were fabricated.

Workshops should advise units requesting these items, that they are now held by Ordnance and fabrication therefore cannot be undertaken by individual workshops. The stock number is 8345-21-108-7478.

RADIO SET C42

The introduction of the Radio Set C42 is by this time well along. To assist in sorting out some of the problems which may arise during this introductory phase these technical notes have been written to pass along information which might not otherwise be available.

EME Manual Instructions

All instructions on the Radio Set C42, type A and B Harness and Vehicle Installations have been published except for:

I 405 Radio Set C42 (Available in early 1962)
K 764 Radio Control Harness Type B (Available in early 1962)
K 774 Radio Control Harness Type A (Available in early 1962)
M 719 Radio Station C42 in Centurion (ARV) Cdn

Test Equipment

The following documents are being revised to show entitlement for Test Equipment as follows:

a. Test Harness and Special Tool C42

CAF S23-500 Supp 4	- Static Workshops
CAF E23-593B	- 202 Base Workshop
CAF E23-590	- RCEME School
EIS 1331	- Installation Kit, Radio and Line
EIS 1332	- Installation Kit, Radio Inspection

b. Cable Assembly Special Purpose

EIS 1381	- Test Set Adapter Kit

c. Basic Radio Set C42

CAF S23-500 Supp 4	- Static Workshops
CAF M23-5948/1	- Fd Workshops
CAF E23-593B	- 202 Base Workshop
CAF E23-590	- RCEME School

The basic radio set as issued to RCEME Workshops both Field and Static is intended as a piece of test equipment to be used in conjunction with the "Test Harness and Special Tools C42". The test harness is being produced by 202 Base Workshop. It will be available for issue by March 30, 1962. This test harness is designed primarily for use with the C42. Instructions will be issued later to adapt it for use with the C11/R210, C45, B47 and B48. B48.

Spares

Unit spares have already been issued to No 1 SSM Battery. Unit Spares for other units will be issued in January 62 as per C42 Basic Scale C120-14. It is understood that the bulk spares will be distributed to the various SPSS's during January 62 in accordance with the concentration of C42 equipment.

Issue scale M/W&L/187 will be replaced by the new Canadian Army Supply Manual W&L 187 which will be published in the spring of 1962. This new manual combines the issue scale and RCOC catalogue complete with pictorial identification and price guide.

Failure Report Cards (CAFC 2379)

All Workshops and User Units should have received an initial stock of C42 Failure Report Cards CAFC 2379 (EME Manual I 409 Instr 1 Refers). If not they should be indented for immediately. The importance of these cards at this time cannot be over stressed. In order for these cards to be of any value, the technicians at Unit or Workshop level must complete a failure report card each time a piece of C42 equipment is repaired. The information on these report cards will be analyzed at DEME. Failure trends will be observed, enabling early corrective action to be taken. When RCEME Workshop or Inspection personnel visit User Units the importance of completing these cards should be pointed out to the Unit technician.

TEST SET, ELECTRON TUBE, TV7 c/u

The following information is provided for this Test Set. In the following chart, the mark "X" shown under any SHORTS switch position indicates what element might be in a shorted condition if the neon lamp glows in that position of the SHORTS switch.

KIND OF SHORT	SWITCH POSITION				
	1	2	3	4	5
Screen to suppressor	X	X	X	X	X
Grid to cathode	X	X	X		X
Filament to plate	X	X		X	X
Filament to grid	X	X			X
Filament to screen	X		X	X	X
Plate to suppressor	X			X	X
Grid to suppressor	X				X
Grid to screen		X	X	X	
Plate to screen		X	X		
Filament to suppressor		X			
Filament to cathode			X		
Grid to plate				X	

To convert the numerical value of the meter reading to mutual conductance in micromhos use the following table:

Meter Reading	Corresponding Value in Micromhos			
	Range B	Range C	Range D	Range E
0	0	0	0	0
10	250	500	1250	2500
20	500	1000	2500	5000
30	750	1500	3750	7500
40	1000	2000	5000	10000
50	1250	2500	6250	12500
60	1500	3000	7500	15000
70	1750	3500	8750	17500
80	2000	4000	10000	20000
90	2250	4500	11250	22500
100	2500	5000	12500	25000
110	2750	5500	13750	27500
120	3000	6000	15000	30000

Electrical equipments as listed below are being introduced as a result of the adoption of the 762 mm Rocket (Honest John). Information which may be of assistance during the introductory phase is also given.

6660-00-682-4459 WIND MEASURING SET AN/PMQ-6

The wind measuring set is used to provide crosswind and rangewind readings from 0 to 50 miles per hour. These readings are used to correct trajectory data pertaining to azimuth (crosswind) and elevation (rangewind) when firing the 762 mm Rocket. Technical publications for this equipment are:

TM11-6660-203-10
TM11-6660-203-20
TM11-6660-203-20P
TM11-6660-203-35
TM11-6660-203-35P

These TMs have been issued to RCEME units supporting the SSM Batteries and additional copies are available through normal channels.

The following personnel received training on this equipment at the RCEME School, 26 - 30 June 61: S Sgt WE Harding, Cpl KD Foster, Cpl CAL Vital, Cfn CW Henning and Cfn WG Johnston.

EME Manuals covering the calibration of the wind measuring set cannot be written at this time until Frequency Meters, counter type, are received early in 62.

6675-00-678-3638 SURVEY INSTRUMENT AZIMUTH GYRO, ARTY

The surveying instrument is used in establishing a true north-south reference line from which azimuth to various points may be accurately determined in artillery fire control and missile laying surveys. Technical publications for this equipment are:

TM5-6675-205-15
TM5-6675-205-25P

These TMs are being produced in the USA and will be available early in 62.

No personnel have been trained on this equipment to date; however, DEME is investigating course availability in the USA.

Delivery of this equipment and special repair tools is not expected before mid 1962.

1055-00-385-8026 GENERATOR SET, GASOLINE ENGINE, M25

The Generator M25 is used, one each, on the following vehicles; Rocket Launcher M386; Rocket Handling Trailer M405A1; and the Heating and Tie-down Unit M78A1. The set supplies power for the heating blankets. It was an Onan gasoline engine and supplies power at 115 volts ac, single phase 75 cycles, 3500 watts and 30 volts dc, 1500 watts. Technical publications for this equipment are:

TM9-1055-203-15
TM9-1055-203-25P

These TMs have been issued to RCEME units supporting the SSM Batteries and additional copies are available through normal channels.

The Generator M25 is of a standard pattern and no special tools or training is required on this equipment.

BLANKET, ELECTRIC, M2

The Blanket, Electric, M2, consists of eight electrically heated and five insulating sections. They are used to maintain the rocket motor propelant at a constant fixed temperature. Technical publications for this equipment are:

TB9-1055-205-35/1
TM9-1055-208-25P
TM9-1055-203-25P

These TMs have been issued to RCEME units supporting the SSM Batteries and additional

copies are available through normal channels. 1055-00-678-8023 Kit Repair, 762 mm Rocket, Electric Blanket, M2, is being obtained to help in the repair of these blankets. It is expected that extensive repairs would be done at base level.

No special training is anticipated for this equipment.

4933-00-620-6501 MULTIMETER M17

The Multimeter, M17, is a device for making prefiring electrical checks of the spin rocket circuits and the motor igniter circuit of a rocket. The multimeter is a user item. Technical publications for this equipment are:

TM9-1055-205-10
TM9-1055-205-20P
TM9-1055-205-35
TB9-1055-205-35/1

These TMs have been issued to RCEME units supporting the SSM Batteries and additional copies are available through normal channels.

The Multimeter, M17, uses a standard circuit and no special tools or training is required.

METER, THERMISTOR CHECK

The Meter, Thermistor Check, is designed to check the functioning of the Blanket, Electric, M2. This is a user item. At the present time no TMs are available for this equipment.

The meter is a standard bridge type and no special tools or training is required.

DISTANCE MEASURING SET AN/TRQ 501

Three distance-measuring sets have been issued to 1 SSM Battery and will accompany the battery to Europe in late 1961. As five instruments are already held by 3 RCHA, the total number held within 4 CIBG will be increased to eight.

Sgt AJ Spencer and Cfn H Nikaido have had RCEME School training on the instrument. Cfn Nikaido is now in Europe and Sgt Spencer will proceed there early in 1962.

Essential or running spares such as tubes and fuses are supplied as a spares kit with each instrument, and form part of the equipment station list. RCOC estimated that bulk spares for all repair levels will be distributed by 1 Jan 62.

Publications and technical data applicable to the instrument are:

a. Operators' Manual for the Operation and Part 1 Maintenance of the Tellurometer Micro-Distancer Model MRA2.

b. Notes to Draft Information - Distance Measuring Set.

c. Draft EME Manual Electrical R 514.

d. Draft EME Manual Electrical R 516.

Item a. is supplied 1 copy per instrument and was also distributed by Army Pubs Depot in May 61. This distribution included one copy to DADEME 4 CIBG and three copies to 4 Field Workshop RCEME.

Three copies each of items b. c. d. were supplied to Headquarters, 4 CIBG as annexures to HQ 6001-Tellurometer (ME8A) dated 25 May 61.

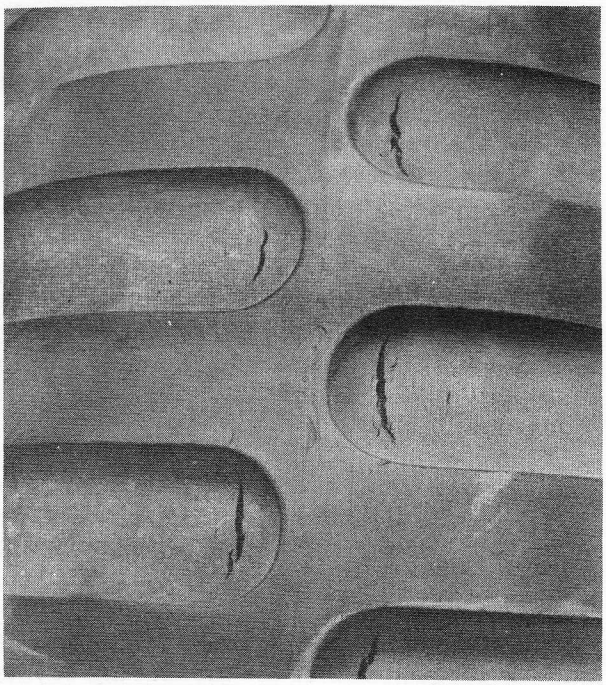
A frequency counter for checking and setting the frequencies of the measuring crystals will be available for issue early in 62. In the interim, procedures detailed in draft EME Manual Electrical R 514 will apply.

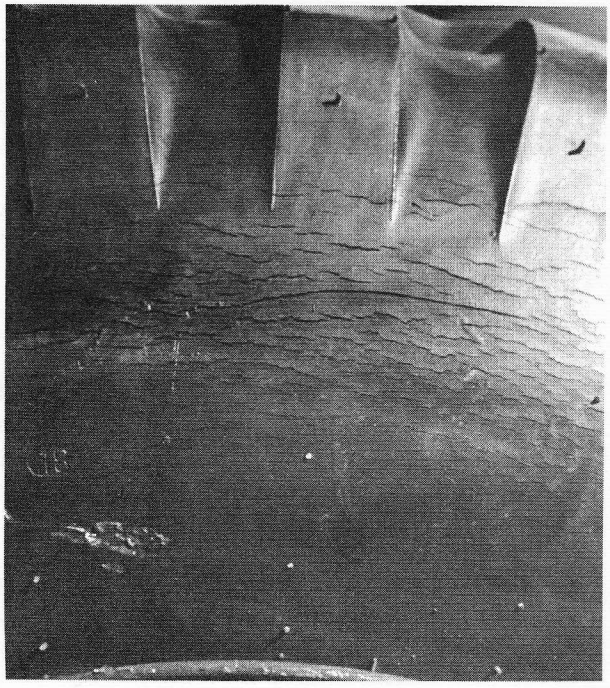
SMP Tire Performance

Tires in storage, before ozone deterioration inhibitors were used, show evidence of cracking in the tread and side walls. It is now policy to issue storage tires in order to maintain mobilization stocks in a serviceable condition. These tires are now considered serviceable but continuation in storage would prejudice their ultimate use.

The high rate of usage on these tires leads to the belief that many are being unnecessarily condemned, probably due to apprehension regarding their safety. Recently some of the worst tires in storage were placed on road test (loaded to highway rating) and all operated 10,000 miles without failure, and with little more than normal wear rates. Pictures illustrate the condition before testing.

These tires are safe to use; however, it is advisable that on a vehicle, and within units, the worst tires will be placed on the rear wheels. When cracking progresses to the cord, the tire can be condemned.





PRESERVATION OF LOOSE VEHICLE ASSEMBLIES

Instances are still occurring where assemblies, backloaded for repair, have suffered further damage due to deterioration in storage. In one case a number of 1/4 ton axle ball joints had rusted to an extent requiring reworking.

Base workshop loading is governed by repair 'as required' to maintain stock levels and on a float basis. Non-serviceable assemblies may remain in storage for some time before repair.

Your attention is directed to EME Manual Vehicle A 353 (para 1) and 354. The principles governing preservation apply to non-serviceable assemblies as well as to serviceable assemblies. It is the responsibility of the sending unit to ensure that preservation is applied to prevent deterioration while in storage.

WHEEL BALANCING EQUIPMENT

From time to time requests have been received for balancing equipment capable of handling wheels up to those sizes used on 5 ton SMP vehicles and buses.

The policy on this matter has not changed and will continue to be:

a. SMP vehicles under normal usage should not require this service. Very bad cases will be handled by local contract.

b. Buses will be done by local contract.

The only exceptions to this policy will be isolated locations where consideration will be given by DEME to individual submissions supported by statistical data in accordance with Director's Letter No 19 dated 1 Dec 60.

Balancing equipment to handle up to 3 ton SC wheels will continue to be supplied to applicable workshops.

(Continued from page 16)

like a first cross between a horse fly and a hornet, and to those bitten by it seems to eat meat in quarter-pound gulps. The noon meal break was most uncomfortable as it is impossible to eat through a mosquito net.

When the vehicle was on firm ground, the oil was drained, plugs removed and another battery installed. When the starter was depressed, one of the DRNL men was bent over the engine and got full benefit of the remains of a hydrostatic lock. DRNL mechanics were confident they could deal with the drowned vehicle in situ, so after a few words of advice and with some misgivings, RCEME bowed out. All gear was collected and ready to load on the return of the helicopter at 1645 hours.

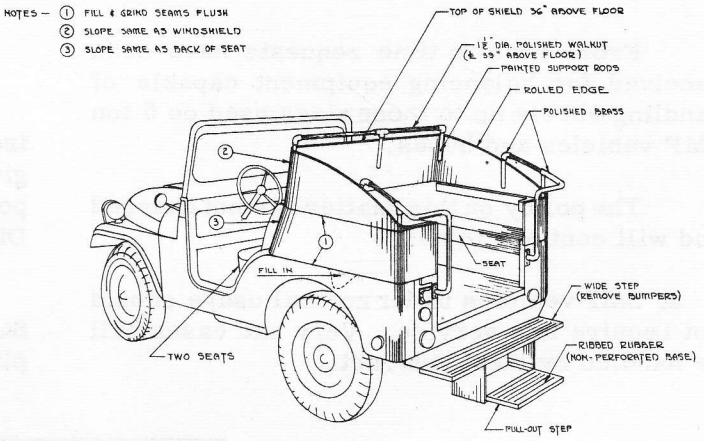
The moral of this story is, that recovery can be done without the use of big heavy equipment, provided you have a helicopter handy.

VIP* JEEPS

The illustration below shows a truck 1/4 ton M38A1 modified at 202 Base Workshop, RCEME, as a 'VIP Jeep'. This particular vehicle was designed with the side entrance which will permit the VIP to step directly from a saluting base or similar platform into the vehicle. This means of entry was suggested by Brigadier (now Major General) WAB Anderson. When he was Commandant of RMC he noticed that the present Governor General had some difficulty stepping up into the vehicle used at that time.

Authority has been granted to manufacture a total of four of these vehicles, one for each Command. However, it is intended that the remaining three be designed as shown in the sketch below. The new design will permit the host dignitary to stand beside the visiting dignitary and will provide some protection from wind and weather. These will also be manufactured at 202 Base Workshop.

* Very Important People


NOTES – ① FILL & GRIND SEAMS FLUSH
② SLOPE SAME AS WINDSHIELD
③ SLOPE SAME AS BACK OF SEAT
TOP OF SHIELD 36" ABOVE FLOOR
1" DIA. POLISHED WALNUT (@ 33" ABOVE FLOOR)
PAINTED SUPPORT RODS
ROLLED EDGE
POLISHED BRASS
SEAT
FILL IN
WIDE STEP (REMOVE BUMPERS)
TWO SEATS
RIBBED RUBBER (NON-PERFORATED BASE)
PULL-OUT STEP

SOME THOUGHTS ON VEHICLE MAINTENANCE IN UNITS

By Lt Col WM Dalrymple MBE, CD

The following are some personal thoughts and opinions which may be of value.

'Old vehicles' is a term used by many to describe any vehicle held by their unit for a year or two. Actually all vehicles in Hagersville could now be referred to as old vehicles as they were manufactured in 1953 or 54. I would think that well-maintained vehicles with 10,000-15,000 miles are better vehicles than those just issued, as all the 'bugs' are out of them, and deteriorated parts have been replaced.

Maintenance is a word that is not completely understood; to help in defining it, I would say that good 'maintenance' involves the following:

a. Proper commitment of the vehicle, with such considerations as overload, speed, etc,

b. Good driving practices,

c. Systematic servicing at established intervals,

d. Regular inspection of a, b, and c, by the unit CO,

e. Completion of repairs promptly when inspection or driver reports indicate there is a need for repair.

Our problem today with transport has many factors, but most of them can be overcome if a CO recognizes that mobility is his number one requirement in a modern army. Our role in national survival imposes even more emphasis on having good reliable transport.

Reliable transport is not possible without good effective control of all factors quoted under maintenance above.

COs, generally, are not transport conscious unless they have been employed as transport officers some time during their careers.

Too often we find a lieutenant detailed as transport officer, and the CO thinks this is experience. In effect, too often, it is exposure. It cannot be experience unless he fits into a well-organized group and is given guidance and support.

In assessing the reason for a large VOR (vehicles off the road) rate in a unit, I would look for the following:

a. Are the RCEME personnel on strength competent and sufficient?

b. Are vehicles systematically made available for inspections?

c. Are drivers recording any abnormal conditions on their work tickets?

d. Are vehicles scheduled promptly for unit repairs shown as required by (b) and (c)?

e. If the unit is complying with the foregoing and exerting their maximum effort, what is the frequency of repair in RCEME workshop, and what kind of service is being provided?

In general, no transport fleet operator can expect to commit all of his equipment all of the time. There must be scheduled 'down time' for maintenance and repair. In the army, if a percentage of transport is held in reserve, it can be rotated at regular intervals and committed to use. There is no reason why 100 per cent of a unit's transport is required for routine training. Consequently, once a year during concentration exercises is the only time we should experience 100 per cent of entitlement.

Team maintenance is an excellent system and will work effectively, provided that the CO of the unit is 'on the team'. It comprises a

systematic routine that has been developed over the years. To properly appreciate the meaning of the term, it is essential to recognize the members of the team in sequence of effectiveness towards successful application:

a. CO of the unit.

b. Sub-unit OCs and officers.

c. Transport officer and NCO.

d. Drivers.

e. RCEME maintenance group.

If an inspecting officer places himself in the category of the coach, he can quickly analyse how well the team captain is doing his work, by co-ordination, co-operation and general supervision of his players.

Brig McKibbin Taking the Salute During the March Past of the Unit

Brig McKibbin Inspecting the Men, Accompanied by Capt JL Moyse and Lt Col Preston

By HC Mussell

In the Feb 1961 issue of the Bulletin we were concerned with getting the money; in June we distributed it; and now we will get on with spending it.

Actually, there is little difference between spending the taxpayer's dollar and spending our own. As individuals, we try to get the best possible value for our dollar and the taxpayer expects us to get good value for his. For PC and LPO purchases, we are responsible for the entire transaction, including negotiation with the contractors. For PRs, DEWAOs and CDs, the negotiation and awarding of the contract are completed by DDP and we are responsible only for ensuring that the work is satisfactory and that the costs are in accordance with the contract.

Which brings up the function of DDP. To consolidate purchasing, even a small firm on 'civvy street' has a purchasing agent. DDP is the purchasing agent for DND. While we may think that we could do the job as well, or better, than DDP, we must not lose sight of the fact that DND purchasing is its job. Therefore, as LPO purchasing is 'allowed' by DDP, it must not be overworked. By the same token, the PR and CD are only pieces of paper which request DDP to purchase services for DND, and we should be very careful in our suggestions to DDP concerning the type of contract or to whom it should be awarded.

DEWAO purchasing is reasonably straightforward. However, we must remember that the DEWAO procedure was originally approved only after strong DND recommendation that the dealer was better equipped than the independent firm. While generally true, this does not always apply and the use of a DEWAO should be very carefully considered if there are independent firms capable of and interested in the work.

EME Manual instructions L 101 to L 105 are being revised. Most of the changes are minor, such as the introduction of new forms. One of your suggestions concerned exchange authority for LPOs and PRs. DEME is in full agreement that there is the occasional need for exchange authority. There is, however, a problem. Crown Assets Disposal Corporation is the only agency authorized to dispose of government stores. We have been trying for over a year to get a simple procedure for obtaining Crown Assets' approval where there is no repair source or where the savings (direct or indirect) would be worthwhile. As our submission has now become tri-service, the effort has been frustrating and time-consuming, and it is doubtful if we will have any change in the exchange policy by the time the EME Manual instructions go to print. Meanwhile, we can only suggest that your 'worthwhile' exchanges be submitted for consideration.

And a Happy New 62-63!

(Story begins on page 40)

freezing to the airstrip and, according to the Daily Telegraph, "it was not practicable to defrost aircraft because defrosting liquid froze before they could take off". However, the air terminal bar was thrown open at the expense of the airline, and we made the best of it.

But in spite of all the bad weather I personally enjoyed my rather short visit. Only the next time I go to the UK on leave it will be during the summer months.

The Price of Owning Aircraft

By Capt RDL Connell CD

Airplanes and helicopters are devices which obey physical laws and have mechanical properties, and if kept within those bounds, may be used to transport people, equipment and supplies. The same definition can be applied to any other form of transport but the advantages of flexibility obtained with aircraft are so great that they outweigh the disadvantages, ie, high operating and maintenance cost. There is nothing mysterious or magic about an aircraft.

Why is maintenance cost so great? Why does it take many hours maintenance for every hour flying time? The answer lies in the fact that small mechanical errors economically acceptable on ground vehicles are not acceptable on aircraft. One cannot tell the pilot to "bring it back if it doesn't work". Faults must be located and isolated before they reach the stage of breakdown. Preventive maintenance reaches new unheard-of proportions in the RCEME Corps. Finding a fault before it happens is difficult because parts are made with very low safety factors. In order to cut down on weight, structural members may be made with varying thicknesses throughout their length. This makes for an expensive piece of equipment. The time lapse between the beginning of a fault and breakdown of the part is usually short. This problem is overcome by frequent and thorough inspections, and safety regulations. The Canadian Army has set as its goal the safety record achieved by the RCAF, which is second to none in the world.

A new breed of tradesmen who think differently must be developed. A course report on a tradesman may have read: "This candidate has an excellent theoretical knowledge of his trade; his practical work while above average is much slower than the rest of the class. Recommend that he undertake further in-job training until he learns to work more efficiently with his hands". The same man employed on aircraft might get the following report: "This candidate has an excellent theoretical knowledge of his trade. He is a careful, painstaking worker who passed the practical portion of the course with an above average result. Recommend he be given signing authority on the CH112 helicopter".

A technician working on airframes can no longer insert a cotter pin and clip off the excess ends inside the fuselage. He must remember to catch those ends to avoid the possibility of them ending up in a control pulley in flight.

Radio Technicians, Electrical Mechanics and Instrument Technicians find new challenges in aircraft. The radio technician does not fix faults as they occur in a set. Sets are removed at periodic intervals and replaced with serviceable sets. The radio technician, in effect, signs that the new set is guaranteed to work. It must, as this set may mean the pilot's life. This then requires a complete specification testing of sets brought in for repair and on sets brought in which are operating satisfactorily but have reached the time limit for replacement.

Quality control in aircraft necessitates the frequent testing of tensiometers, torque wrenches and tire gauges. When was the last time you heard of a torque wrench or a tire gauge being calibrated? Incorrect tire pressure may result in 'ground resonance' or bouncing of a helicopter and destroy it on landing on take off. POL handling takes on new importance as the lighter weight engines are designed for a narrower range of fuels than we are used to in trucks.

The RCAF is very careful when granting signing authority to otherwise fully-qualified tradesmen. Tradesmen do not exist in the RCAF who have made two mistakes. The RCAF have no sympathy or time for such people after the first mistake. They are released from the service regardless of rank or experience. By the same token the opinion of tradesmen in the RCAF is regarded as gospel by all ranks.

This results in a built-in prestige and morale factor among technicians which can only lead to first class work.

Spare parts are also handled differently. Bolts are no longer 'common hardware'. A dozen bolts of the same standard size and thread will be made of different grades of steel or will have undergone different heat treatments to produce customized shear and tensile strengths. Repair instructions always specify a particular bolt which may even appear far too weak to do the job, but if a substitute bolt is used, it will not stand up to the designed load. Faith in spare parts personnel reaches new unheard-of proportions. Pre-ordering of parts is routine, based on estimated flying time. Parts which are exchanged on a time basis are called 'time expired' or 'TX items'. A structural member or engine part which is accidently dropped may not be acceptable for use on the aircraft. It may have to be returned through supply channels to be magnafluxed for possible weaknesses. Here again the pilot's life may be in the hands of the spare parts storeman clerk.

Repair of the aircraft is controlled by a 'log book' as for any other piece of equipment and a 'log control' which is a BF system for TX items. Log control is a record of log book entries and is kept at field workshop level in order to forecast flying time and to pre-order time-expired parts or call the aircraft in for a thorough periodic inspection. The log book contains a "Primary Inspection Certificate", and "Blue" and "Pink" defect sheets. The Primary Inspection Certificate is made out daily and contains the entries which certify that daily servicing (gas, oil, etc) has been done, that the aircraft is serviceable, and the pilot's certification that he has examined the "Blue" and "Pink" sheets. The "Blue" sheet contains minor faults which do not effect the airworthiness of the aircraft. The "Pink" sheet is the most respected piece of paper in the business. Anyone, and this literally means anyone, may make an entry on the "Pink" sheets. This automatically grounds the aircraft until it is cleared.

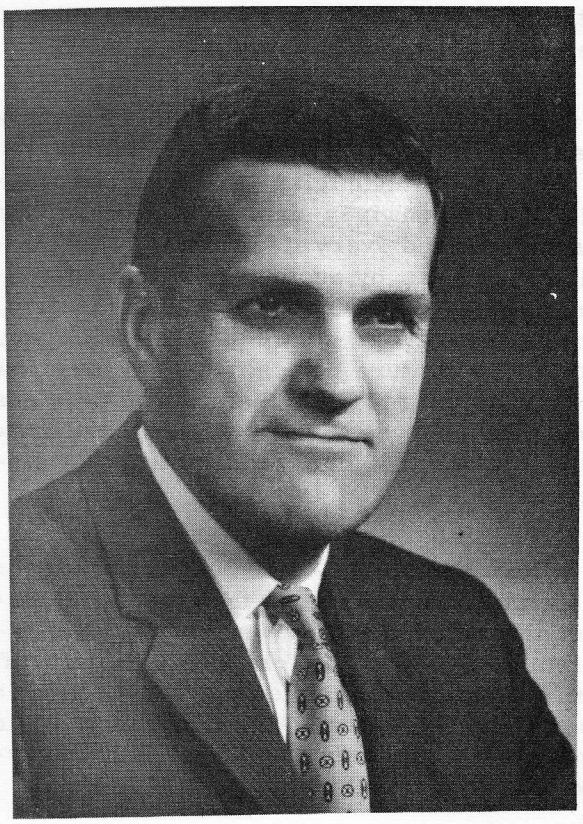
Clearing the entry may be done in three ways: by rectifying the fault; by a downgrading to the "Blue" by the Aircraft Engineering Officer; or an entry by the person who entered the original fault stating that it was entered in error.

The rectification of the fault requires three signatures: The first by an experienced GP 2 or above technician who does the work and who has been given signing authority; (This must be renewed every six months.) The second signature is by another qualified tradesman, usually the NCO in charge of the section, who inspects every detail of the work done. The third signature is restricted to very few persons and certifies that the two previous tradesmen have been given signing authority and are therefore authorized to release the aircraft for flying.

Note that no provision has been made for the Commanding Officer of the user unit to release the aircraft. There should be little requirement in peacetime for COs to fly aircraft that are regarded as unsafe by RCEME. In such cases the authority requesting the release would have to accept the aircraft without RCEME certification of airworthiness.

Are aircraft worth all this trouble? Ask any armoured commander who has used helicopters which while vulnerable to small arms fire can cross any obstacle and travel at 60 knots, compared to scout cars sensitive to every forest, stream, enbankment or minefield and travel at 10 mph. The aircraft is a useful tool, which when its limitations are recognized, provides the commander with a tremendous increase in flexibility. RCEME then has two facts to consider. That aircraft are here to stay and all ranks must recognize that because of their construction and their use, they must be maintained and repaired just a little differently than the way we are used to repairing watches or trucks.

IN RETROSPECT



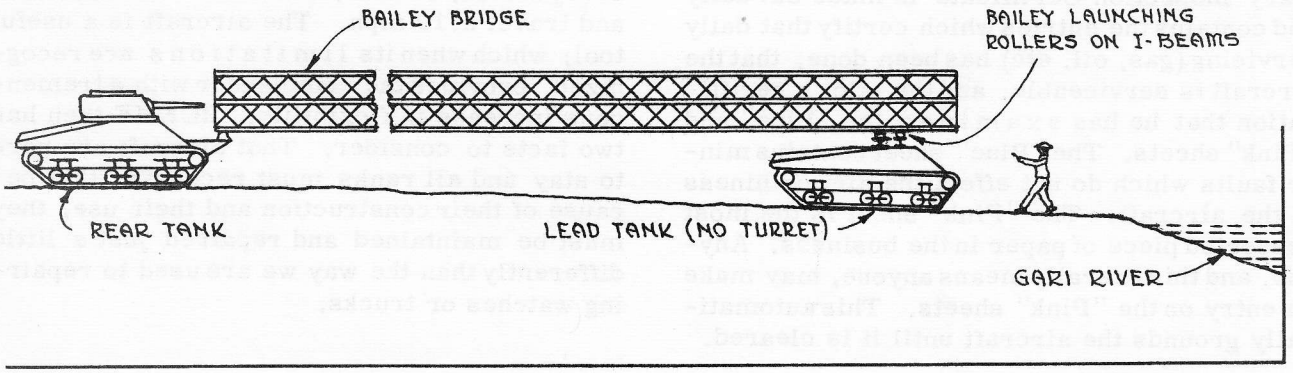
Hugh Anthony Gault Kingsmill MC
Manager of the District Sales
Offices in Canada of the Aluminum
Company of Canada

The Award of The Military Cross to Captain Hugh Anthony Gault Kingsmill Officer Commanding, 61 Light Aid Detachment attached to 14 Canadian Armoured Regiment (The Calgary Regiment)

By Lt Col RH Hodgson CD

The 1st Canadian Armoured Brigade had been assigned the task of supporting the 8th Indian Division located in the Sant' Angelo sector, south of the Gustav Line for the allied attack to capture Rome. Between The Calgary's tanks and the Gustav Line swirled the waters of the Gari River.

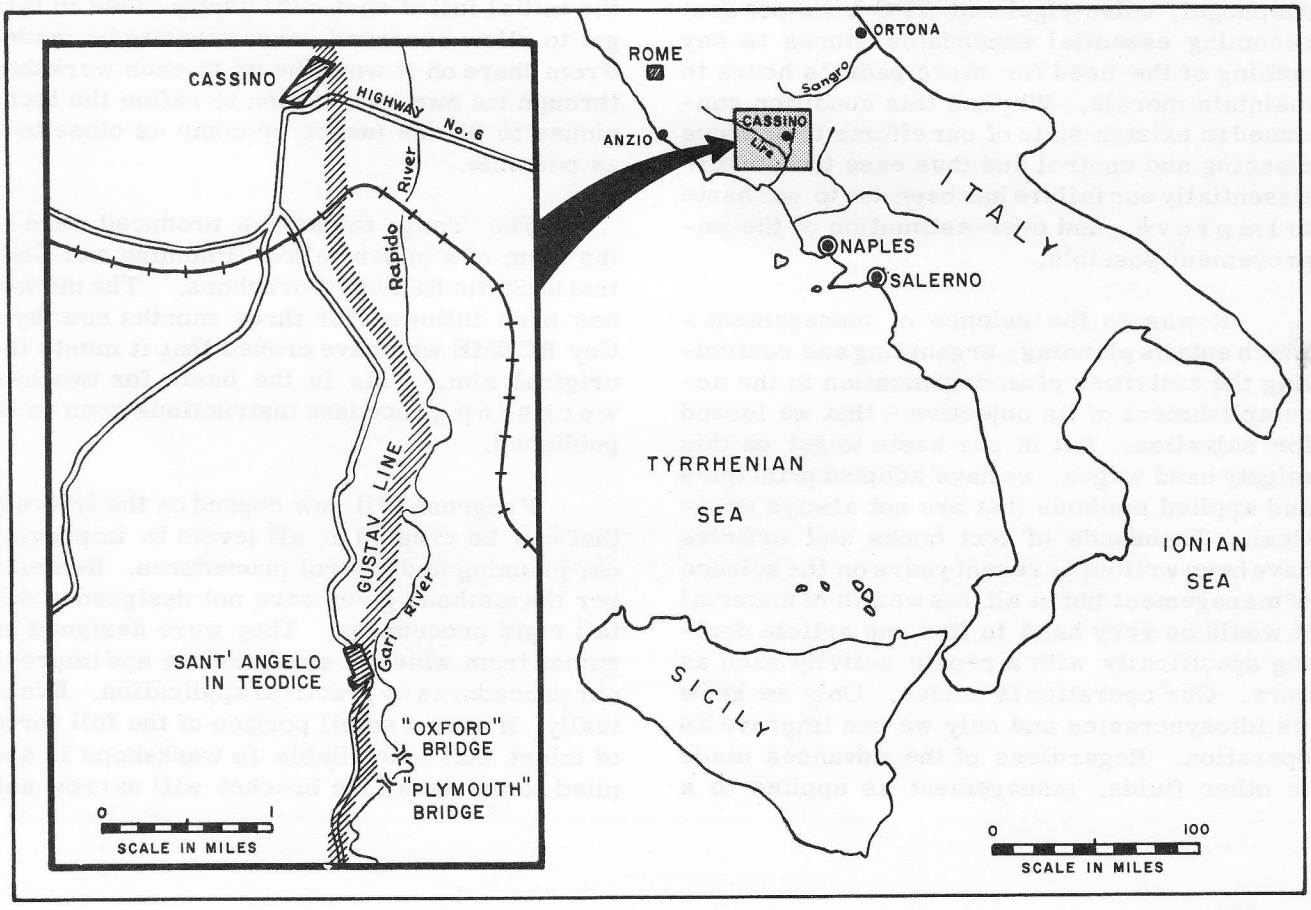
Captain Kingsmill conceived and had accepted a novel method for rapidly launching a bridge across the angry waters. The bridge, a single-double Bailey 100 feet long was carried forward on two Sherman tanks belonging to The Calgarys. The lead tank's turret was replaced by rollers, and supported the front portion while the rear tank was fastened to the back of the bridge. When the lead tank was in position, the rear tank would push the bridge across the river.



At 11 o'clock on the night of 11 May 1944 the battle for Rome began. While Canadian and Indian Sappers struggled to construct other conventional bridges and the beach parties launched their assault boats, there was no activity at the bridge site (given the code name of Plymouth) selected by Kingsmill and the Indian Engineer Officer, until early morning.

Captain Kingsmill's citation best describes the event:

".... As a result of many rehearsals and careful preparation, the bridge framework was assembled in daylight under heavy enemy concentrations. Then, at once, under direct observation and subject to intense mortar and machine gun fire Captain Kingsmill, with no thought for his own safety, coolly walked backwards over a distance of 500 yards in front of the tank-borne bridge. He directed it successfully into place at the first attempt. Wounded by an exploding shell he dauntlessly remained at the river crossing during the final securing of the span. When an enemy counterattack developed from the opposite side of the river in an effort to dislodge the bridge, he climbed inside one of the two supporting tanks, methodically proceeding to machine gun the German fire position. Determined to stem the attack, he called for and received artillery support. Not until the counterattack was beaten off and the bridge was firmly in place did Captain Kingsmill consider leaving to have his wounds attended. His courage and determination were at all times beyond praise. His most gallant action contributed directly in the smashing of the Gustav Line."



A Challenge To You

Thoughts on the Management of our RCEME Operation

By Maj RC Rivers CD

There has always been some form of planning and control in our workshops. Its effectiveness varies greatly from one workshop to another but generally speaking a minimum acceptable standard was always achieved for no workshop has ever failed to meet the essential tasks with which it was faced. Examined critically, however, from the standpoint of efficiency there has been and continues to be room for improvement.

Too many of our responsibilities are being met jumping from one crisis to another. Amphogel, kolantylgel and APC & Cs are fast becoming essential expendable stores to say nothing of the need for more padre's hours to maintain morale. Why has this condition continued to exist in spite of our efforts to improve planning and control and thus ease the strain? Essentially our failure has been due to our haste to improve, and over-estimation of the improvement possible.

It was to the science of management - which entails planning, organizing and controlling the activities of an organization in the accomplishment of its objective - that we looked for salvation. But in our haste to get on this mighty band wagon, we have adopted principles and applied methods that are not always practical. Thousands of text books and articles have been written in recent years on the science of management but in all this wealth of material it would be very hard to find one article dealing specifically with a repair activity such as ours. Our operation is unique. Only we know its idiosyncrasies and only we can improve its operation. Regardless of the advances made in other fields, management as applied to a RCEME workshop will never be an exact science. Nevertheless through the intelligent application of management principles we can reduce our field of fire to acceptably 'bracket' the target.

It was with these thoughts in mind that the Command EME Quebec Command guided the development of a set of what might be called "management range tables" for planning and control of Static RCEME workshops. The aim was to produce a workable approach to this phase of workshop operations that would guide the initial fall of shot sufficiently close to target to allow observed corrections to be made. From there on it would be up to each workshop through its own calibration to refine the techniques to hit the target or come as close to it as possible.

The "range tables" as produced were in the form of a paper called "Planning and Control in Static RCEME Workshops." The method has been followed for three months now by 4 Coy RCEME who have proved that it meets the original aim. This is the basis for two new workshop procedure instructions soon to be published.

Progress will now depend on the interest that can be created at all levels in improving our planning and control procedures. Remember the methods given were not designed to detail rigid procedures. They were designed as guides from which to slowly refine and improve our procedures by practical application. Eventually, if even a small portion of the full force of talent that is available in workshops is applied to the task, the bracket will narrow and

related documents and paper procedures will become progressively more practicable.

Be critical in your assessment of these and in particular of their practical application. They are not a finished product and may never be one. Improvement is needed and should be continuous - and this depends on your constructive criticisms. Planning and control principles in published form will at best only bracket the target. With your help principles will be developed that have a uniform application yet are still flexible enough to allow the different workshops requirements to be met efficiently.

POSTSCRIPT - DIRECTORATE COMMENT

The article above presents the personal views of the author. Some of these are debatable, and might well be considered controversial. For example, does the fact that our methods of planning and control not always work well and leave room for improvement really constitute "failure"? As the author points out the application of the science (and art) of management to an enterprise like ours breaks new and difficult ground. If we are making any progress at all over this ground, we are not failing. And if our progress is not as far or fast as we might wish, is this "essentially" because we were too hasty in jumping on the "mighty band wagon"? Or might it equally be because we were reluctant to abandon the back-yard garage approach and tended to pay lip service only to principles of scientific management?

As we said, some of the points are debatable, and possibly controversial. Be that as it may, the Directorate wholeheartedly supports the principal points which we paraphrase below:

1. Our workshop planning and control methods leave room for improvement.

2. The intelligent application of scientific management principles, techniques and methods will effect improvement.

3. We will find few, if any, ready-made examples to follow. It falls on us in RCEME to use our talents and knowledge of our own operation to devise our own applications.

4. Instructions issued must have uniform application but be flexible enough to meet the varying circumstances of different workshops.

5. Continuing improvement of our methods depends on constructive criticism from the field.

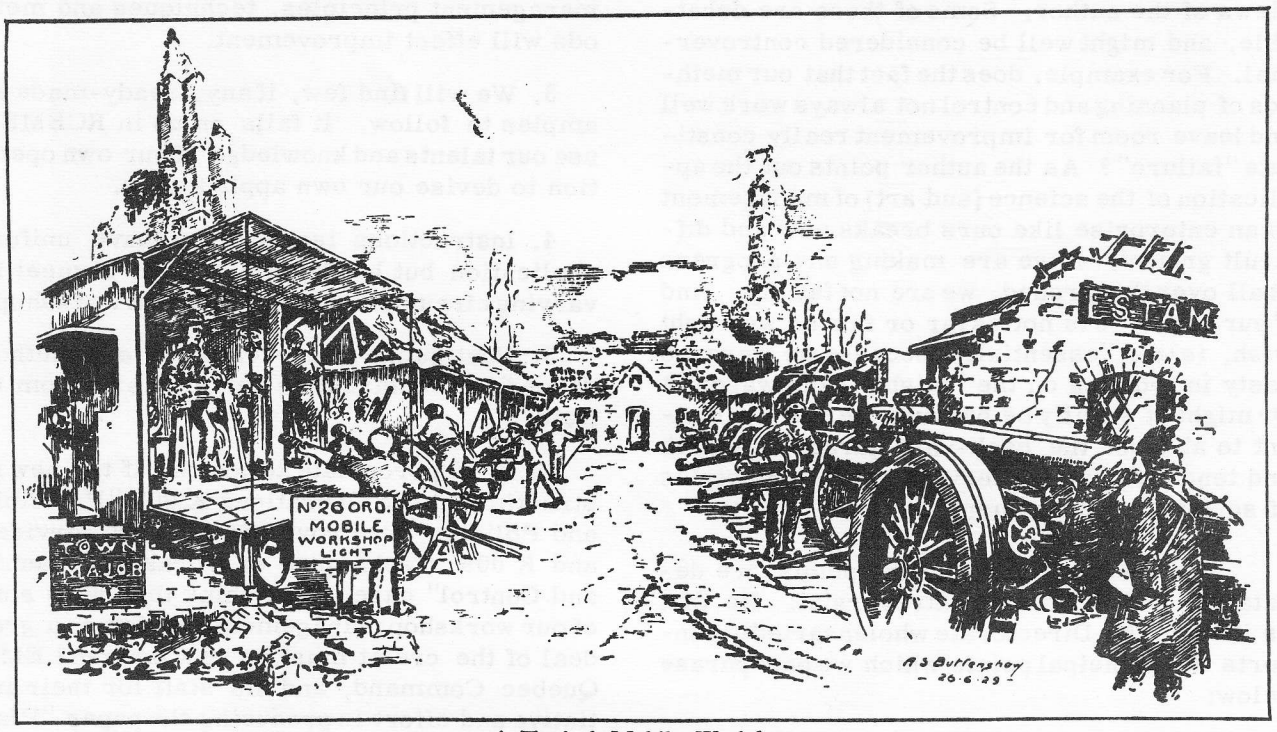
It is appropriate to add that if the new instructions Static Operations K 008 "Principles and Policies for Providing RCEME Services" and K 009 "Techniques of Workshop Planning and Control" ease (as we think they will) some of our workshop management problems, a great deal of the credit must go to Command EME, Quebec Command, and his staff for their initiative and effort in producing the paper "Planning and Control in Static RCEME Workshops" and testing its methods in 4 Coy RCEME.

MACHINERY LORRIES - PAST, PRESENT AND FUTURE

The illustrations below show typical machinery lorries or trucks used in World War 1, the Second World War, and one of our current Special Equipped Vehicles (SEVs). The trend toward lighter and smaller machinery trucks is illustrated by the Landrover equipped for telecommunications repair developed for British Airborne Units. A more complete summary of the present situation regarding RCEME SEVs is planned for the next Bulletin.

WORLD WAR 1

The Canadian Ordnance Travelling Workshop was formed in Halifax 13 Oct 15, staffed by the Permanent Force. Three days later it sailed for England and trained there until going to France 5 Mar 16. It became No 26 Canadian Ordnance Mobile Workshop (Light) on 16 Mar 16.



A Typical Mobile Workshop

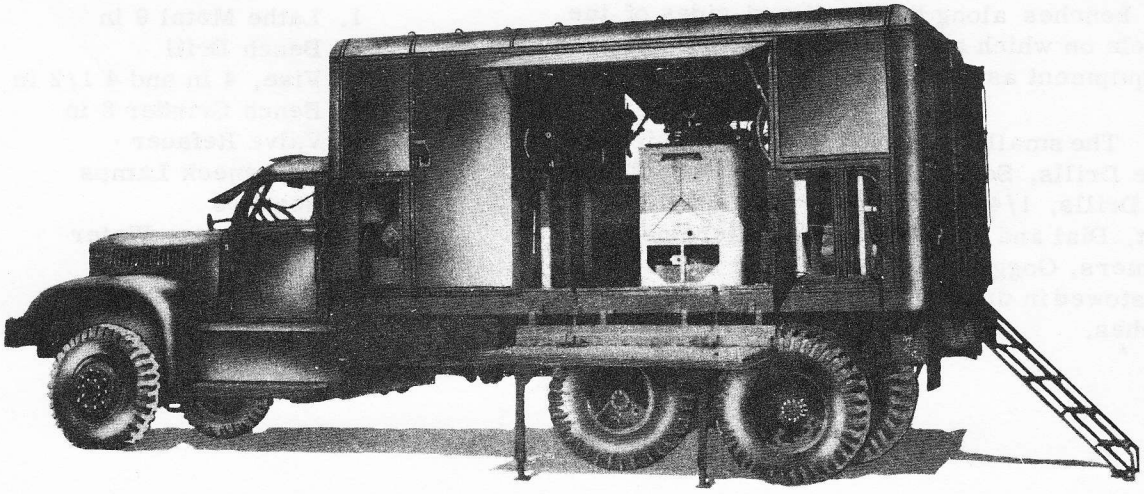
The workshop lorries sent to the River Marne, France, in Sep and Nov 1914, for repairing guns close to their batteries, proved so successful that in the following May the scale per corps was doubled - from one to two!

The Light Workshop establishment was 1 Inspector of Ordnance Machinery (IOM) and 21 men. Its equipment was carried in two vehicles. One was fitted out as a workshop and the other was used to carry the stores. Later, additional holdings of machine tools required a third vehicle.

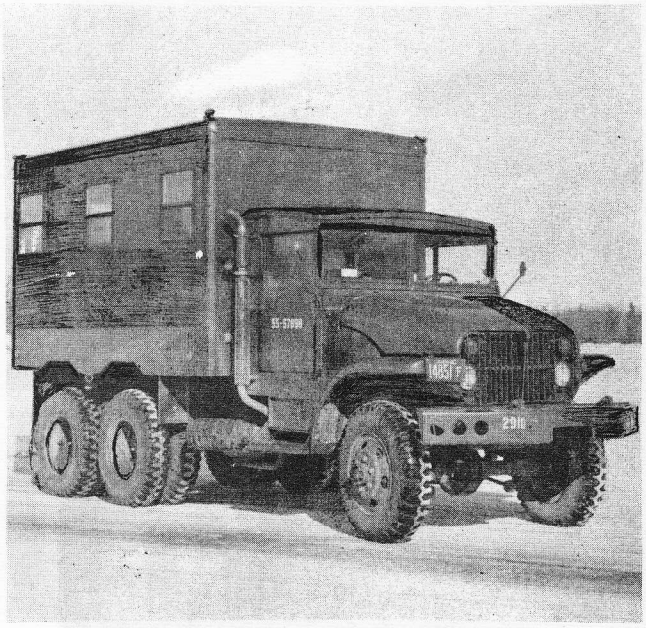
"Workshop on Wheels" Made by Peerless Motor Car Co of Cleveland in 1914. These were Assembled in Toronto for the Canadian Expeditionary Force.

THE SECOND WORLD WAR

The Machinery Lorry type M was used to provide general and mechanical maintenance of transport vehicles. It was fitted with workshop and electrical equipment, and mechanic's tools, and was self-contained, providing lighting and power for its various machines.

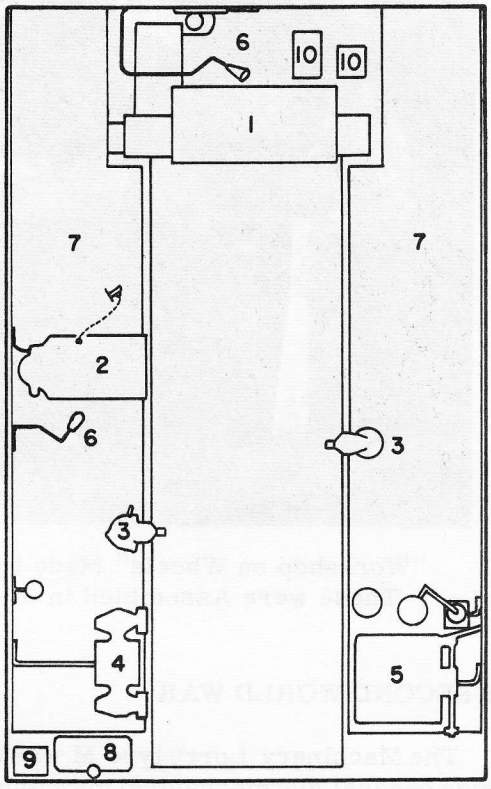


THE PRESENT



Truck, Shop Van, 2 1/2 ton, 6 x 6

This van is fully enclosed, all-steel construction, and insulated. It has two doors with windows in the rear and three windows on each side. Kits are available to adapt the same basic vehicle to many uses.



The Machine Shop Kit consists of cabinet type benches along the front and sides of the vehicle on which are mounted the major items of equipment as shown in sketch.

The smaller items of equipment which include Drills, Screw Extractors, Files, Electric Drills, 1/4, 1/2 and 3/4 in, Lathe equipment, Dial and Feeler Gauges, Micrometers, Reamers, Goggles, and many other small tools are stowed in drawers and shelves beneath the benches.

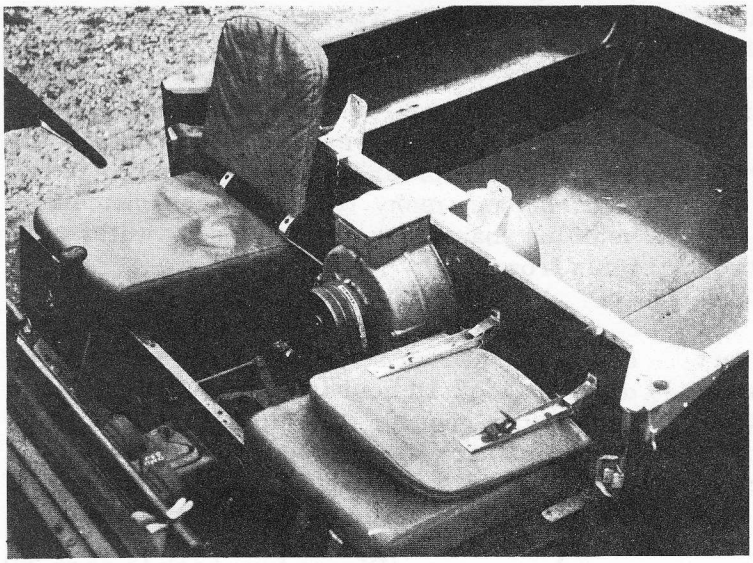
1. Lathe Metal 9 in
2. Bench Drill
3. Vise, 4 in and 4 1/2 in
4. Bench Grinder 8 in
5. Valve Refacer
6. Gooseneck Lamps
7. Benches
8. Ameri-can, Water
9. Threading Set
10. Containers Oil

THE FUTURE

Parachute Workshop (REME)

The aim of developments since 1959 has been towards a further reduction in the number of platform loads required by the workshop, at any rate in the initial stages, without a corresponding decrease in efficiency.

Telecommunications testing and repair equipment has been fitted to the sides of a Landrover, thus dispensing with the need for the wireless repair trailer. The ac power is supplied by the 1 1/2 KVA portable generator carried inside the vehicle. Dropside benches and penthouses permit repairing under cover. The vehicle usually tows the 1/2 ton stores trailer.



A further reduction in prime movers and trailers was achieved by fitting a 4 1/2 KVA generator (Ashton Young) to the power take-off of a Landrover. The generator, which is of revolutionary design, weighs only 220 lbs and occupies only a minor part of the carrying space in the vehicle. Heavy duty springs and shock-absorbers fitted to the Landrover permit normal loading of the vehicle in addition to the generator.

CHRISTMAS 1961 ABROAD

By Cpl GA Cook

After just returning from a bit of leave in England, I can honestly say, "Thank goodness for central heating." During the two weeks I was there, the thermometer dipped down to six degrees; this was a record for London, being the coldest in 91 years (1870). With the dampness that is always present, this was cold.

We left Dorval Airport, Montreal, on 17 December on a Britannia and landed at London Airport 9 hours later. London hasn't changed much since my last visit in 1955. Regent Street was again colorfully decorated from one end to the other, this year with lighted crowns and streamers, but aside from everyone getting on with Yuletide festivities, Londonders and the rest of the country were experiencing a deep freeze. One Automobile Association spokesman referred to it as "Britain on Ice". However, the ever-popular carollers were out, going from door to door singing carols; this is something you don't see too often in this part of the world.

One change I did notice was the higher prices for almost everything from fares on the underground to theater tickets. For instance, on the tube train from Ruislip Manor to Baker Street the fare was previously 2 shillings and sixpence; now it is 4 and six. I took my children to see the pantomime "Peter Pan" which they thoroughly enjoyed although they wondered why Peter Pan should be a girl - a tradition, of course, with pantomime. The prices for this had gone up from 6 to 8 shillings for the cheapest seats.

Over the New Year's week-end my family and I made a short trip to Bournemouth, about 86 miles south of London on the Channel. The weather was considerably warmer in that part of the country. However, the morning we arose to return to London there was, to me, a familiar white blanket of snow covering everything, though the local city folk didn't think much of it. Back in London the three inches that fell was some kind of a record. Anyway we all boarded the wee automobile and started our - what turned out to be - long journey. Because of the snow and ice conditions many roads were closed and cars abandoned. We finally had to take a route via Southampton and back up to London rather than up through the New Forest via Salisbury and Red Lynch. When we finally arrived back we had travelled something short of a hundred miles in five and a half hours, normally a two to three hour journey. Between pushing other cars and our own I had a pair of wet feet and pant cuffs. This was miserable weather even to the Canadians visiting the Old Country, who suffered with the cold and found it hard to take at times. Even Big Ben's chimes were ten minutes late at 11:30 pm on New Year's Eve.

London is used to forty and fifty degree weather and little or no snow and, not being fully equipped for snow removal and sudden changes in temperature, everything more or less came to a stand still. London Airport with its heavy air traffic became over twenty hours behind schedule, trains were tied up or stations closed. Generally all types of travel were slowed down or stopped. People were complaining of burst or frozen water pipes (good old central heating) and private autos were bogged down due to the lack of snow tires or chains; "an ice cream factory refrigeration system froze and ice cream melted", according to the London press. The island was literally "in an uproar", motoring conditions bad to atrocious, many train services cancelled, vehicles abandoned, roads closed, water supplies frozen.

Oh, yes, as I mentioned before about London Airport being some 20 hours behind schedule. It took 26 hours for our Boeing 707 to get off the ground. One flight for Kingston, Jamaica, that was supposed to leave on Dec 31, finally made it on Jan 2. Apparently one of their toughest problems was the aircraft wheels

(Please turn back to page 29)

WHO'S WHERE

BRIGADIERS

JW	Bishop	Comd HQ BC Area	KH	McKibbin	Comd HQ West Ont Area

COLONELS

RA	Campbell	DEME	EC	Mayhew	Chief Superintendent AEEE
CW	Jones	CO 202 Base Wksp RCEME	A	Mendelsohn	Commandant, The RCEME School
WS	Hunt	MA Belgrade			

LIEUTENANT COLONELS

VW	Bethel	DSO&P	EC	Ilott	DEE
GW	Bruce	DEME	GT	Kirk	HQ RCEME Eascom
DA	Campbell	DEME	AHR	Lewis	HQ RCEME Quecom
GG	Cavaghan	D Pers (Plans)	AL	MacLean	DEE
HL	Cohen	AEEE	IM	McLaughlin	Cdn Arsenals Ltd
EW	Coleman	DEME	WJ	Owens	RMC of S
JC	Currie	AEEE	CG	Provan	CASC
WM	Dalrymple	204 Base Wksp RCEME	AM	Reid	DEME
CMR	Elmsley	DEME	HM	Robinson	DEME
H	Goodfellow	HQ RCEME Wescom	JP	Sherren	DEME
HW	Hagey	DPW	GW	Thompson	DEP
WG	Hamilton	HQ RCEME Cencom	KR	Ward	CAS (W)
RHC	Hodgson	DEME			

MAJORS

J	Adams	202 Base Wksp RCEME	WE	Ellis	2 Coy RCEME
RW	Anderson	1 Coy RCEME	HHE	Erb	The RCEME School
BE	Babcock	204 Base Wksp RCEME	RF	Fendick	HQ 3 CIBG
HC	Banham	The RCEME School	JJ	Garnett	C&D CALE (Exch Offr)
P	Bateson	TAHQ Calgary, Olds Alta	SA	Girdler	HQ RCEME Eascom
CH	Betts	HQ RCEME Wescom	WH	Glover	The RCEME School
EP	Bishop	DDP	DA	Grant	204 Base Wksp RCEME
JC	Boughton	DADEME HQ 4 CIBG	WJN	Haggins	11 Coy RCEME
EM	Brignell	202 Base Wksp RCEME	HV	Hann	202 Base Wksp RCEME
DD	Campbell	3 Coy RCEME	EJ	Hare	DEME
DG	Carlyle	DQMG (EE)	EJO	Harvey	DEME
FW	Chapman	DEME	TR	Heal	18 Coy RCEME
JF	Clarabut	56 Cdn Inf Wksp	EF	Hendricks	DEME
BC	Clerke	DEE	CA	Hurst	7 Coy RCEME
EW	Cole	4 Coy RCEME	AJ	Jeffery	5 Coy RCEME
KF	Collins	DEE	FG	Johnson	DEP
JH	Coombe	DEME	EG	Jones	204 Base Wksp RCEME
FE	Cooper	13 Coy RCEME	KR	Joslin	Inc 'C' 4 Fd Wksp
F	Coultish	D Pers RCEME	FR	Kaye	16 Coy RCEME
KLF	Coupland	The RCEME School	DT	Kennedy	Insp Services
BB	Cox	DEME	VD	Kenyon	CALE
AM	Croft	AEEE	HLM	King	AEEE
JJE	Cuddihey	4 Fd Wksp RCEME	JS	Kitto	The RCEME School
BM	Diebert	202 Base Wksp RCEME	CG	Lawrence	7 Coy RCEME
FL	Demone	6 Coy RCEME	RW	Libbey	DEME

JL	Loughridge	204 Base Wksp RCEME
LH	Love	AEEE
RL	MacDonald	202 Base Wksp RCEME
ALD	Macdonell	C&D CALE
JH	MacLean	AEEE
AGM	Maitland	JSSC, Latimer, Bucks, England
RA	McKay Keenan	Detroit Arsenals
HE	McLaughlin	DEME
GP	Miggins	12 Coy RCEME
PH	North	CASC
GL	O'Brien	DEE
KS	Parton	13 Coy RCEME
HCR	Pfeiffer	DEE
JN	Pinder Moss	AEEE
PLW	Platt	DRB
CG	Racicot	14 Coy RCEME
W	Rhodes	AEEE
RC	Rivers	HQ RCEME Quecom
ANP	Roberts	C&D War Office CALE
M	Ruscher	HQ RCEME Cencom
LA	Sainsbury	DEE
IC	Scarlett	The RCEME School
FJ	Sergi	DEE
RN	Shaw	The RCEME School
JO	Sheehan	DEE
JL	Sloan	AEEE
WG	Svab	2 Fd Wksp RCEME
SG	Tait	202 Base Wksp RCEME
AR	Thomsen	204 Base Wksp RCEME
DJ	Tidy	AEEE
JM	Treleaven	Civil Service Commission
JD	Trevithick	AEEE
PA	Tuck	3 Fd Wksp RCEME
WW	Virtue	1 Fd Wksp RCEME
RW	Vollett	AEEE
EA	Williams	10 Coy RCEME
WR	Willing	DEME
JA	Wilson	DEME
GA	Wright	CAS (W)
B	Yarymowich	DEP

CAPTAINS

KI	Anderson	6 Coy RCEME
WM	Argue	4 RCHA LAD RCEME
LW	Armstrong	2 Coy RCEME
GE	Ball	1 Coy RCEME
NE	Birchard	Scaling Offr HQ 4 CIBG
GN	Brent	DEME
JE	Brewster	18 Coy RCEME
JE	Brown	DEME
PL	Burcombe	202 Base Wksp RCEME
FJ	Burton	202 Base Wksp RCEME
GR	Burton	The RCEME School
CO	Bush	HQ RCEME Cencom
LN	Bydal	The RCEME School
JL	Calvert	8 Coy RCEME
JNR	Campbell	12 Coy RCEME
WM	Campbell	4 CIBG LAD
AB	Cantlon	The RCEME School
FR	Carruthers	RMC
HW	Chapman	BEME HQ 4 CIBG
G	Charles	13 Coy RCEME
TM	Chell	1 Fd Wksp RCEME
JE	Coates	DEME
WG	Collins	The RCEME School
RDL	Connell	202 Base Wksp RCEME
JH	Cooper	Inc 'C' 4 Fd Wksp
JN	Courtney	CASC
EB	Creber	CASC
DH	Cumming	The RCEME School
DH	Curling	FGH LAD
LA	Daviss	202 Base Wksp RCEME
JD	Delaney	14 Coy RCEME
FF	Doherty	DEME
OA	Edmond	204 Base Wksp RCEME
AS	Etter	8 Coy RCEME
SHJ	Fleming	202 Base Wksp RCEME
RJ	Francis	1 RCHA LAD
DH	Fraser	DEME
DV	Geary	1 Fd Wksp RCEME
AM	Gilbert	DEME
FB	Goring	56 Cdn Inf Wksp
RE	Goulding	3 CIBG LAD
NA	Graham	2 CIBG LAD
GE	Grainger	AEEE
JR	Griffin	AEEE
ADL	Grinham	DEME
WJA	Groom	19 Coy RCEME
GM	Hagan	The RCEME School
DV	Hampson	CAS(W) (Office Chief of Ord)
PEV	Hansen	RMC of S
CB	Hellyer	LdSH (RC) LAD
FA	Hlohovsky	Suffield Exp St Ralston Alta
HW	House	4 Fd Wksp RCEME
O	Howard	The RCEME School
AW	Hughes	11 Coy RCEME
RG	Humphreys	11 Coy RCEME
MC	Johnston	University of Michigan
JJ	Kane	202 Base Wksp RCEME
JR	Kaye	1 CIBG LAD
KT	Kennah	CJATC
JE	Kerr	DEME
JJ	Klinec	DEME
NE	Laviolette	The RCEME School
JW	Lelacheur	7 Coy RCEME
AC	Leonard	RMC
WF	Lucano	11 Coy RCEME
AM	MacDonald	The RCEME School
JA	MacDonald	RMC
AJ	MacGillivray	8 CH LAD
RL	MacIntosh	Redstone Arsenals
RMG	MacKenzie	14 Coy RCEME
RH	MacLeod	CADEE
E	MacMillan	3 Coy RCEME
DM	Maher	56 Cdn Inf Wksp
JD	McDougall	AEEE

JS	McIntyre	DEME
MD	McKinlay	Queens University
FJ	McNaughton	AEEE
CA	Millar	AEEE
JF	Moore	DEME
CR	Morgan	4 Coy RCEME
DR	Mowbray	13 Coy RCEME
JL	Moyse´	204 Base Wksp RCEME
DA	Nicholson	CADEE
PB	Nicholson	AEEE
WH	Norton	DEME
JF	O'Connor	202 Base Wksp RCEME
JR	O'Neill	DEME
FA	Ouimet	5 Coy RCEME
TW	Oxley	204 Base Wksp RCEME
TR	Palfrey	16 Coy RCEME
DB	Perrin	16 Coy RCEME
HR	Perry	DEME
JR	Peters	10 Coy RCEME
R	Peters	13 Coy RCEME
HA	Popkin	DQOP
CH	Putt	DEME
JR	Raby	4 Fd Wksp RCEME
JA	Richards	The RCEME School
AT	Roberts	204 Base Wksp RCEME
HL	Robinson	The RCEME School
V	Roddick	13 Coy RCEME
PF	Romyn	202 Base Wksp RCEME
HA	Rosson	4 Fd Wksp RCEME
WGL	Russell	202 Base Wksp RCEME
DA	Saunders	D Pers RCEME
GD	Savage	11 Coy RCEME
RB	Screaton	RCD LAD
WR	Shaw	HQ 4 CIBG
WJ	Shearing	3 RCHA LAD
WD	Sneddon	The RCEME School
JA	Stott	7 Coy RCEME
EJ	Stow	10 Coy RCEME
GW	Swallow	DEME
WA	Thomas	The RCEME School
HK	Warren	The RCEME School
BH	Wright	DEME

LIEUTENANTS

AM	Adams	Queens University
GF	Bews	AEEE
JMF	Bourassa	202 Base Wksp RCEME
FN	Brodie	7 Coy RCEME
LJE	Byer	Inc 'D' 4 Fd Wksp
DM	Campbell	16 Coy RCEME
CA	Churchill	AEEE
PR	Comeau	202 Base Wksp RCEME
EM	Conway	8 Coy RCEME
WWD	Cruden	The RCEME School
PR	Dack	The RCEME School
JS	Davies	HQ RCEME Wescom
JHJG	Delisle	10 Coy RCEME
JGR	Doucet	2 Fd Wksp RCEME
JP	Durocher	5 Coy RCEME
CG	Edgar	10 Coy RCEME
HT	Edworthy	The RCEME School
JAFL	Gagnon	The RCEME School
PM	Graye	4 Fd Wksp RCEME
RT	Hare	8 CH LAD
LM	Harvey	202 Base Wksp RCEME
JH	Hayward	University of Toronto
JML	Hebert	RCD LAD
HJ	Hellard	The RCEME School
DV	Hill	12 Coy RCEME
FG	Hutson	RCAF Stn Clinton
WR	Hyman	202 Base Wksp RCEME
ID	Isbester	Queens University
AF	Johannes	4 Fd Wksp RCEME
DC	Kaufman	7 Coy RCEME
GW	Keays	3 Coy RCEME
JMA	Lachance	Ecole Polytechnique
JWLP	Lee	3 Fd Wksp RCEME
GE	Maguire	The RCEME School
GK	Maguire	DEME
MG	Masuda	2 RCHA LAD
GD	McCulloch	56 Cdn Inf Wksp
AL	McEachern	16 Coy RCEME
DG	McKay	HQ RCEME Eascom
HJ	Millen	13 Coy RCEME
RW	Miller	16 Coy RCEME
TME	Mimee	The RCEME School
HG	Morgan	FGH LAD
REM	Nourse	14 Coy RCEME
STA	O'Farrell	RCAF Stn Clinton
HA	Patterson	10 Coy RCEME
JE	Peacock	DEME
CA	Penny	The RCEME School
WC	Perry	202 Base Wksp RCEME
PP	Pospisil	10 Coy RCEME
RH	Purton	DCER
JA	Remington	LdSH (RC) LAD
GS	Rippengale	The RCEME School
EA	Rochefort	13 Coy RCEME
CE	Rooney	11 Coy RCEME
AG	Rose	HQ RCEME Wescom
JAP	Rouillard	Ecole Polytechnique
WRL	Springford	University of Toronto
JT	Thompson	202 Base Wksp RCEME
RH	Thorn	The RCEME School
JLF	Tremblay	The RCEME School
JMR	Turcotte	3 Fd Wksp RCEME
RL	Walker	202 Base Wksp RCEME
DE	Wilson	56 Cdn Inf Wksp
B	Wong	1 Fd Wksp RCEME
Z	Yarymowich	2 Fd Wksp RCEME

SECOND LIEUTENANTS

GWE	Godson	5 Coy RCEME	GP	Pothier	6 Coy RCEME
GT	Lake	Queens University	CF	Potter	13 Coy RCEME

OFFICER CADETS

		2nd Phase	3rd Phase	University			2nd Phase	3rd Phase	University
TCP	Adams		X	McGill	JPJ	Levesque	X		Montreal
RE	Betzner	X		Sask	RB	Manning		X	RMC
RP	Britt	X		McGill	DP	Nikiforuk	X		Royal Roads
HD	Byer		X	UNB	JAR	Parent		X	Laval
W	Boychuk	X		RMC	RC	Patterson		X	NSTC
A	Boucher	X		Laval	C	Presseau	X		CMR
JCD	Croakston	X		Toronto	LC	Roy		X	RMC
LC	Dekconning		X	OAC	J	Sanders	X		U of BC
JE	DeLaplante		X	Toronto	BH	Simms		X	Memorial
JA	Dixon	X		UNB	VB	Suddaley	X		U of Sask
MJJR	Jiroux	X		CMR	TW	Strong	X		U of Alta
JLRL	Langevin	X		RMC	AD	Tupper	X		Mt Allison
JR	Levesque		X	RMC					

RCEME MILITIA UNITS

2nd Tech Regt	1055 St Gregoire St, Montreal 34, Que	A/Lt Col	GL	Marrotte
4th Tech Regt	Falaise Bldg, 443 Fleet St W, Toronto, Ont	Lt Col	JL	Forrest, CD
5th Tech Regt	Burlington St Armoury, Hamilton, Ont	Lt Col	SG	Bittles, MBE
7th Tech Regt	Minto Armoury, Winnipeg 10, Man	A/Lt Col	AW	Fia
8th Tech Regt	Hangar 6, North Jericho, Vancouver 8, BC	Lt Col	EH	Goodwin
9th Tech Regt	10th Ave & 7th St W, Calgary, Alta	A/Maj	CH	Collett
20th Tech Sqn	Windsor Park, Windsor St Extension, Halifax	Maj	KF	Duggan
21st Tech Sqn	The Armoury, Moncton, NB	Maj	AE	Emery, MBE
22nd Tech Sqn	PO Box 205, Cap de la Madeleine, Que	Maj	JB	Pierce
24th Tech Sqn	64 Belvedere St, Sherbrooke, Que	Maj	RB	Sweet, CD
25th Tech Sqn	Camp Vaudreuil, Roberval St, Arvida, Que	Maj	JGG	Simard
28th Tech Sqn	The Armoury, Peterborough, Ont	Maj	AA	Wiggans
30th Tech Sqn	219 Welland Ave, St Catharines, Ont	Capt	RT	Hayworth
31st Tech Sqn	Blairmore, Alta	Lt	RC	Munson
32nd Tech Sqn	Lethbridge, Alta	Maj	RA	Lane, CD
33rd Tech Sqn	The Armoury, Sudbury, Ont	Maj	EC	Harber, CD
34th Tech Sqn	The Armoury, Sault Ste Marie, Ont	Maj	AM	Cameron
35th Tech Sqn	Port Arthur, Ont	Maj	WG	Dolman
37th Tech Sqn	New Saskatoon Armoury, Corner Ave A North and 31st St, Saskatoon, Sask	Capt	AJ	Balcaen, CD
38th Tech Sqn	100th Ave at 109th St, Edmonton, Alta	A/Maj	FD	Laird
39th Tech Sqn	St Luke's Road Barracks, c/o Walkerville PO, Windsor, Ont	Maj	AH	Tupper
40th Tech Sqn	Bay St Armoury, Victoria, BC	Maj	WH	Coull
42nd Tech Sqn	Parc d'Artillerie rue d'Autouil, Quebec, Que	Capt	B	Rondeau